

# Anatolian and the Laryngeal Theory

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## Introduction

Let us start by reiterating the basic premises of the “Laryngeal Theory”. Beginning with an article published in 1927 and culminating in the theory presented in Chapter 2 in his 1935 book *Études indoeuropéennes I*, the Polish Indo-Europeanist Jerzy Kuryłowicz (1895—1978), attempted to demonstrate that the so-called “original long vowels” reconstructed by the Neogrammarians for Proto-Indo-European were the result of a contraction of short vowels with certain consonantal elements, upon their loss. Kuryłowicz (1935:28) called these elements “consonantal ə (schwa)”, which he wrote \* $\varrho$ . Kuryłowicz made additional discoveries as a result of his investigations, eventually developing the core tenets of the Laryngeal Theory, which remain to the present day. In his 1935 book (1935:28—30), Kuryłowicz summarized his findings as follows:

1. Every Proto-Indo-European original long vowel (that is to say, not arising through analogical lengthening nor through the contraction of two short vowels) is a contraction of a short vowel with one of three following consonantal elements (\* $\varrho_1$ , \* $\varrho_2$ , \* $\varrho_3$ ), thus: \* $e + \varrho_1 > \bar{e}$ , \* $e + \varrho_2 > \bar{a}$ , \* $e + \varrho_3 > \bar{o}$ ; \* $o$  (derived from \* $e$  through qualitative Ablaut) + \* $\varrho_1 > \bar{o}$ . Notes: (1) Kuryłowicz was uncertain about whether \* $o + \varrho_2 > \bar{o}$ , due to the lack of positive examples. He was also unable to ascertain whether \* $\bar{o}$  was the result of \* $o + \varrho_1$  or of \* $e + \varrho_3$ . (2) According to Sturtevant (1942:27 and 1951:49—51), \* $\varrho_3$  did not change a contiguous \* $e$  to \* $o$ .
2. When \* $\varrho$  was found between vowels, it disappeared. The resulting vowels were then contracted, thus: \* $a^x \varrho a^x > \bar{a}^x$ .
3. When \* $\varrho$  was found between two consonants, it disappeared without a trace, except in Greek.
4. When \* $\varrho$  was found between a consonant and an immediately following vowel, it also disappeared. However, in Indo-Iranian, \* $k$ , \* $t$ , \* $p +$  prevocalic \* $\varrho > \bar{k}h$ , \* $\bar{t}h$ , \* $\bar{p}h$ . The sound which the Neogrammarians designated as vocalic \* $\varrho$  is the reduced vowel \* $e$ , which remained after the disappearance of the consonant \* $\varrho$ .
5. Every Proto-Indo-European word beginning with a vowel has lost an initial \* $\varrho$ . The character of the lost \* $\varrho$  is revealed by the quality of the remaining vowel, thus: \* $e- < \varrho_1 e-$ , \* $a- < \varrho_2 e-$ , \* $o- < \varrho_3 e-$  (provided that “original \* $o$ ” is involved and not an Ablaut grade of \* $e$ ). On the other hand, there were also certain roots beginning with a consonant that were derived from an earlier sequence of \* $\varrho +$  consonant. Such roots were simplified by the simple loss of \* $\varrho$ , except in Greek and Armenian. In composition (and also in *sandhi*), after a preceding short vowel, the loss of initial preconsonantal \* $\varrho$  resulted in the lengthening of that vowel: \* $E + \varrho T > \text{long vowel} + T$  (\* $E$  = vowel; \* $T$  = consonant).

6. In Hittite words of Indo-European origin, *h* seems to continue  $*\varrho_2$ . However, there is also a group of Indo-European words with  $*\tilde{a}$  in which *h* is missing in Hittite. These seem to be due to a different cause than a neighboring  $*\varrho_2$ . These can be attributed to the presence of a fourth type of  $*\varrho$  in Proto-Indo-European, namely,  $*\varrho_4$ , which was lost in Hittite.

To recapitulate:

1. Proto-Indo-European had at least three, possibly four “laryngeals” (= Kuryłowicz’s “consonantal *a* [schwa]”). (Note: The term “laryngeals” refers to these sounds as a class and says nothing about their phonetic make-up (cf. Laroche 1986:134). The term was introduced by Hermann Möller [1917].)
2. Two of these laryngeals are preserved in Hittite, where they are written (initially) *h*-, (medially) *-h(h)*-.
3. The loss of laryngeals between a short vowel and a following consonant resulted in the compensatory lengthening of these vowels.
4. Several of these laryngeals had “vowel coloring” effects — that is to say that they changed the quality of contiguous vowels.
5. Every Proto-Indo-European root began with a consonant. The roots traditionally reconstructed with an initial vowel have lost a preceding laryngeal.
6. Though not directly preserved as such, the laryngeals left discernable traces in the non-Anatolian Indo-European daughter languages. Note:  $*\varrho_2$  is now known to have been partially preserved in Classical Armenian.

Kuryłowicz correlated his theory of “consonantal *a* (schwa)” with the “coefficients sonantiques” posited in 1878 by the young Ferdinand de Saussure and with the “laryngeals” posited by Hermann Möller (1917) on the basis of his comparative work on Indo-European and Semitic. Möller’s term has stuck.

Though there have been many refinements in the Laryngeal Theory since 1935, Kuryłowicz’s presentation remains the foundation of the theory. Nevertheless, though the Laryngeal Theory has now gained universal acceptance, the exact number and phonetic character of the laryngeals are still being debated.

Finally, the Proto-Indo-European reconstructions I am proposing in what follows are informed by my work on distant linguistic relationship (cf. Bomhard 2021). Hence, where they exist, references are given to the pertinent Nostratic etymologies. Moreover, the notes accompanying the individual examples are particularly important.

## The Anatolian Evidence

At the time when Kuryłowicz wrote (1935), the remaining Anatolian daughter languages (Cuneiform and Hieroglyphic Luwian, Palaic, Kalasmaic, Lycian, Milyan, Lydian, Carian, Pisidian, and Sidetic<sup>1</sup>) were not sufficiently known to be included in the discussion. That situation has since been rectified, though not all questions have been

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<sup>1</sup> Pisidian, Sidetic, and Kalasmaic will not be considered in this paper due to the paucity of evidence.

answered. In the following sections, the evidence from the Anatolian daughter languages will be included. Kurylowicz's symbols ( $*\varrho_1$ ,  $*\varrho_2$ ,  $*\varrho_3$ ,  $*\varrho_4$ ) will be used in this part of the discussion when referring to the Proto-Indo-European laryngeals (other notational conventions are found in the relevant literature:  $*H_1$ ,  $*H_2$ ,  $*H_3$ ,  $*H_4$ ;  $*h_1$ ,  $*h_2$ ,  $*h_3$ ,  $*h_4$ ; etc.). Also, the Proto-Indo-European reconstructions will be given in accordance with the Glottalic Model of Proto-Indo-European consonantism (cf. Bomhard 2016; Salmons 1993) — when different, they will be immediately followed, in brackets, by the traditional reconstructions found in the standard etymological dictionaries and comparative grammars. Finally, at this point, I will not address the question of subgrouping, though I have long supported the view that the Anatolian branch was the first to split off from the main Indo-European speech community — this view is now gaining wide acceptance.

I would like to emphasize that not every issue will be addressed, and not every point of view or proposed explanation will be considered. Instead, I will be stressing what seem to me to be the principal developments of the laryngeals in the Anatolian daughter languages — that is to say, the developments that seem to be best supported by the available evidence.

## Hittite

Hittite texts date from the 16th to the 13th centuries BCE and number well over 30,000 tablets. Thus, Hittite is the best attested Anatolian daughter language. During that period of time, Hittite went through several stages of development (Old Hittite, Middle Hittite, and New or Neo-Hittite) and changes in its writing system (old ductus, new ductus).

Throughout its recorded history, Hittite was written in a form of cuneiform syllabary,<sup>2</sup> which was ultimately created to record Sumerian. Indeed, Sumerian logograms (so-called “Sumerograms”) regularly occur in Hittite texts (for a detailed description of Hittite writing conventions, cf. Hoffner—Melchert 2008:9—24). Due to the writing of Sumerograms for several common words, the underlying Hittite words are unknown. Finally, the cuneiform syllabary was an imperfect medium for writing Hittite, and, as a result, uncertainties remain concerning important aspects of Hittite phonology. For information on the origin of cuneiform writing in general, cf. Walker 1998; Woods 2020.

According to Yakubovich (2020:227), the Hittite phonological system was most likely as follows:

Stops: <sup>3</sup>	/p(p)/	/t(t)/	/k(k)/	/k(k) <sup>w</sup> /
	/b/	/d/	/g/	/g <sup>w</sup> /
Affricate:		/ts/		
Fricatives:		/s/	/x/	/x <sup>w</sup> /
			/ɣ/	/ɣ <sup>w</sup> /
Nasals:	/m/	/n/		

<sup>2</sup> A small number of texts are written in hieroglyphs.

<sup>3</sup> According to Bomhard (2019b), the voiceless stops (/p(p)/, /t(t)/, /k(k)/, /k(k)<sup>w</sup>/) were actually aspirated voiceless stops (/p<sup>h</sup>/, /t<sup>h</sup>/, /k<sup>h</sup>/, /k<sup>wh</sup>/). Bomhard interprets medial double writing of stops in Hittite as the means used to indicate the presence of aspiration, on the one hand, and gemination, on the other hand. This interpretation was first suggested by Thomas Gamkrelidze (1968 and 1982) — see also Patri 2019:204.

Liquids:		/r/, /l/	
Glides:	/w/		/j/
Vowels:	/i/, /i:/	/e/, /e:/	/o/, /o:/
		/a/, /a:/	/u/, /u:/

Regarding the laryngeals, Yakubovich (2020:227—229) states:

A peculiarity that sets Hittite phonologically apart from the non-Anatolian Indo-European languages is the presence of so-called “laryngeals”, namely, /x/, /χ/, /xʷ/, and /χʷ/. They are rendered in Hittite by the same signs <ḫa>, <ḫi>, <ḫu>, etc. as those used for combinations involving the Akkadian fricative /ḫ/. The system of four contrasting “laryngeals” proposed above is based on Kloekhorst (2008, 27), while certain other reconstructions assume fewer elements belonging to this class. The precise phonetic realization of Hittite laryngeals is subject to much debate, but the renderings of the phoneme /x/ in Egyptian and Ugaritic converge in the interpretation of its counterparts in the first millennium Anatolian languages leading to the conclusion that its most likely articulation in Hittite was a velar or uvular fricative (cf. Weiss 2016). This appears to agree with the assumed value of /ḫ/ in Akkadian (cf. Chapter 7).

The ancient Indo-European languages outside Anatolian are commonly assumed to have lost their “laryngeals” with secondary phonological effects, such as compensatory lengthening and change in vowel quality. For example, *\*peh<sub>2</sub>s-* ‘to pasture, protect’ is thought to have yielded Hittite *paḫš-* and *\*pās-* in many Indo-European groups outside Anatolia, as in Latin *pās-tor* ‘shepherd’ (Kimball 1999, 402). Nevertheless, the hypothesis that the loss of “laryngeals” represents a classifying innovation of non-Anatolian Indo-European, although vehemently defended in (Lehrman 1998), is now a minority view. Most Indo-Europeanists are convinced that the “laryngeals” /h<sub>1</sub>/, /h<sub>2</sub>/, and /h<sub>3</sub>/ are independently required in order to explain non-trivial correspondences between non-Anatolian Indo-European languages, e.g. Sanskrit *guru-* ~ Greek βαρύς ~ Latin *grāvis* ‘heavy’, which are commonly reconstructed as PIE *\*gʷ<sub>2</sub>h<sub>2</sub>u-* ‘heavy’. The set of such beliefs, which had begun to develop long before the decipherment of Hittite, is known as the Laryngeal Theory.

At the same time, the frequently advanced claim that Hittite data provided a definite confirmation to the validity of the Laryngeal Theory is inaccurate, because the number and distribution of “laryngeals” in Hittite is different from what is typically reconstructed for Proto-Indo-European. In fact, the precise pattern of correspondence between the reconstructed Indo-European and Anatolian “laryngeals” represents one of the most controversial aspects of Anatolian historical phonology. In order to appreciate the extent of existing differences of opinion, it should suffice to compare the accounts of Melchert (1994, 64—74, 122), on the one hand, and Kloekhorst (2006, 77—95), on the other hand.

For our purposes, the following transliterated cuneiform signs were available in Hittite to write laryngeals (cf. Sturtevant 1951:13—14):

aḫ	ḫa	ḫat	saḫ
iḫ	ḫal	ḫé	taḫ
uḫ	ḫar	ḫi	túḫ
daḫ	ḫur	ḫu	
duḫ	ḫaš	maḫ	

These signs were ultimately taken over from Akkadian. As noted in the quotation above from Yakubovich, *ḫ* represents a voiceless velar fricative (IPA [x]) in Akkadian (cf. von Soden 1995:31).

As with the writing of stops, medial single as opposed to medial double writing of laryngeals is usually taken to indicate some sort of phonemic contrast. The laryngeals \* $\text{ḫ}_2$  and \* $\text{ḫ}_3$  are assumed to have been preserved in Hittite (and Anatolian in general), while \* $\text{ḫ}_1$  and \* $\text{ḫ}_4$  are assumed to have been lost.

## Palaic

Palaic is very poorly documented. It is only found in a small number of cuneiform texts preserved in the Hittite national archives at Hattusas. The texts deal with cultic/ritualistic matters. Palaic had ceased to be a spoken language by the Neo-Hittite period (14th—13th centuries BCE), perhaps even earlier.

According to Melchert (2004b:586), the Palaic phonological system included at least the following consonants:

/p/	/t/	/k/	/k <sup>w</sup> / <sup>4</sup>
/b/	/d/	/g/	/g <sup>w</sup> /
	/ts/		
/f/ <sup>5</sup>	/s/	/ʒ/ <sup>6</sup>	/x/ <sup>7</sup>
			/ɣ/
/m/	/n/		
	/l/	/r/	
/w/		/y/	

According to Melchert (2004b:587), Palaic had the following vowels:

/i/, /i:/	/u/, /u:/
/e/, /e:/	
/a/, /a:/	

## Cuneiform Luwian

Cuneiform Luwian is much better documented than Palaic. As the name suggests, it is the form of Luwian written in the cuneiform syllabary. It is found first in an extensive body of texts preserved in the Hittite national archives at Hattusas. The texts are primarily

<sup>4</sup> I have added the voiceless and voiced labiovelars /k<sup>w</sup>/ and /g<sup>w</sup>/ to the table. They are missing in the original, though Melchert (2004b:586) does mention that there is “a good chance” that they should be included.

<sup>5</sup> /f/ is found in Hattic loanwords.

<sup>6</sup> /ʒ/ may represent a weak palatal fricative, though this is not entirely certain.

<sup>7</sup> Melchert interprets the laryngeals as voiceless and voiced pharyngeal fricatives (/ħ/ [= \* $\text{ḫ}_2$ ] and /ʕ/ [= \* $\text{ḫ}_3$ ]). However, he notes that they could have been voiceless and voiced velar fricatives (/x/ and /ɣ/) instead. The interpretation of the Palaic laryngeals as velar fricatives is now the prevailing view.

ritualistic in nature, and most date from the Neo-Hittite period (14th—13th centuries BCE). In addition to the specifically Cuneiform Luwian documents, a number of Luwian words are scattered here and there throughout Hittite texts, where they are indicated as such by so-called “Glossenkeil” — distinguishing wedges placed before the words in question. Lastly, there are a number of Luwian loanwords in Hittite.

According to Melchert (2020:247—248), the Cuneiform Luwian phonological system was most likely as follows (see also Melchert 2004a:579—580):

Stops:	/p/	/t/	/k/	/k <sup>w</sup> /
	/b/	/d/	/g/	/g <sup>w</sup> /
Affricate:		/ts/		
Fricatives:		/s/	/x/	/x <sup>w</sup> /
			/ɣ/	/ɣ <sup>w</sup> /
Nasals:	/m/	/n/		
Liquids:		/r/, /l/		
Glides:	/w/		/j/	
Vowels:	/i/, /i:/			/u/, /u:/
		/o/, /o:/ <sup>8</sup>		
		/a/, /a:/		

## Hieroglyphic Luwian

As the name implies, Hieroglyphic Luwian is the form of Luwian written in a native hieroglyphic script. The script was used to inscribe writings on stone monuments and seals. The hieroglyphic inscriptions begin to appear from the 13th century BCE, though some writings may actually be older. The script contains over 500 signs (cf. Laroche 1960), some of which have more than one value.<sup>9</sup> The ultimate origin of the script is unknown.

No doubt, the phonological system given above for Cuneiform Luwian came close to what existed in Hieroglyphic Luwian. However, due to the limitations of the Hieroglyphic script only the following vowels and consonants were represented in the writing system — these are rendered in accordance with the conventional transcription:

Vowels:	a	i	u
Consonants:	p	t	k
		z	
		s	h
	m	n	
		r, l	
	w	y	

<sup>8</sup> Whether Luwian (and Hittite) had the vowels /o/ and /o:/ is quite uncertain.

<sup>9</sup> Two signs exhibit dual vocalization (*ra/i* and *wa/i*), while one sign exhibits triple vocalization (*la/i/u*). Moreover, some sounds could be written with several different signs.

## Lycian and Milyan

Lycian and Milyan are closely-related dialects. They are written in an alphabet derived from or close to Greek. Both are considered to belong to the Luwian branch of Anatolian (cf. Adiego 2016:51; Kloekhorst 2022:67—68). The Lycian corpus is represented by a little over 150 stone inscriptions as well as over 200 coins. Only two of the extant texts are written in Milyan. In certain aspects, Milyan appears to be more archaic than Lycian.

According to Melchert (2004c:592), the Lycian phonological system included the following consonants:<sup>10</sup>

Stops: <sup>11</sup>	/p/	/t/ <sup>12</sup>	/c/ <sup>13</sup>	/k/	/k <sup>w</sup> / <sup>14</sup>
Affricate:		/ts/ <sup>15</sup>			
Fricatives:	/θ/	/s/	/h/ <sup>16</sup>	/x/ <sup>17</sup>	
	/β/ <sup>18</sup>	/ð/		/ɣ/	
Nasals:	/m/	/n/			
Liquids:		/r/, /l/			
Glides:	/w/		/y/		

Lycian had the following vowels (cf. Melchert 2004c:595—596):

/i/	/u/
/e/	
/a/	

Each vowel had contrasting nasalized varieties, though separate letters exist for only /ã/ and /ẽ/. Lycian vowels were subject to a widespread vowel assimilation rule — Melchert (2004c:595) renders this rule as follows: V [-high] > V [α back] / \_\_ CoV [α back]. Melchert points out that there are many exceptions to this rule. Finally, it should be mentioned that prehistoric syncope was widespread in Lycian (cf. Melchert 2004c:596).

## Lydian

Lydian is rather poorly documented and still not completely understood. There are only a little over extant 100 texts, less than 30 of which contain more than just a few words.

<sup>10</sup> The transcription given here is slightly different from that used by Melchert.

<sup>11</sup> The stops have voiceless and voiced allophones. According to Melchert (2004c:593), the voiced allophones occur after nasals and nasalized vowels, while the voiceless allophones occur elsewhere.

<sup>12</sup> Proto-Anatolian \**k<sup>w</sup>* becomes *t* in Lycian before *i* and possibly *e*.

<sup>13</sup> /c/, /θ/, and /h/ are only found in Lycian, not in Milyan.

<sup>14</sup> /k<sup>w</sup>/ is found only in Milyan in personal names.

<sup>15</sup> This sound is traditionally transcribed as *z*.

<sup>16</sup> /h/ is due to a change of /s/ to /h/ in Lycian — this change did not occur in Milyan.

<sup>17</sup> /x/ (traditionally transcribed as *χ*) appears as *q* in the name of the Storm-God *trqqñt*-. It probably represents a labialized /x/, that is, /x<sup>w</sup>/.

<sup>18</sup> The phonemes shown in the table as /β/, /ð/, and /ɣ/ are traditionally transcribed as *b*, *d*, and *g*.

Lydian is written in an alphabet derived from or close to Greek. According to Melchert (2004d:603), the Lydian phonological system included the following consonants (see also Gusmani 2000—2002:21—23):

Stops: <sup>19</sup>	/p/	/t/	/k/	/k <sup>w</sup> /
Affricates:		/ts/ (?)		
		/dz/ (?)		
Fricatives:	/f/	/s/ <sup>20</sup>	/ç/ <sup>21</sup>	
	/v/	/ð/ (?)		
Nasals:	/m/	/n/, /v/ <sup>22</sup>		
Liquids:		/l/	/r/, /λ/ <sup>23</sup>	

Lydian probably had the following vowels (cf. Melchert 2004d:604):

/i/	/u/
/e/	/o/
/a/	

There were also two nasalized vowels, though their phonetic values are uncertain.

## Carian

The Carian corpus is extremely limited. The extant texts can be dated approximately to the fourth to the third centuries BCE.

Though there has been substantial progress over the past forty years in the interpretation of the values of the Carian letters, there are still unresolved problems and disagreements. As noted by Melchert (2004e:609—610) concerning the decipherment and interpretation of the values of the Carian letters:

A new era began in 1981 when John Ray first successfully exploited the evidence of the Carian-Egyptian bilingual tomb inscriptions to establish radically new values for several Carian letters, as well as to confirm the values of others. Additional investigation, notably by Ray, Ignacio Adiego, and Dieter Schürr, has led to further revisions and refinements of the new system. The basic validity of this approach was shown by its correct prediction of Carian personal names which have subsequently appeared in Greek sources. Nevertheless, many uncertainties and unsolved problems remained, and several reputable experts were skeptical of the new interpretation of the Carian alphabet.

<sup>19</sup> Though underlyingly voiceless, Lydian stops may have had voiced allophones in certain environments, though this is not normally indicated in the writing.

<sup>20</sup> /s/ is traditionally transliterated as *ś*.

<sup>21</sup> /ç/ is traditionally transliterated as *s*.

<sup>22</sup> The phonetic value of the letter transcribed as *v* is uncertain.

<sup>23</sup> /λ/ is probably the result of the prehistoric palatalization of /l/.



Melchert (2004e:610) gives the following table of a subset of characters of the Carian alphabet:

Table 23.1 A subset of characters of the Carian alphabet	
Character	Transcription
Α	a
ϸ	d
Δ	l
Ϸ	ù
ϸ	r
Ι	λ
⊕	q
Γ	b
Λ	m
Ο	o
ϣ	t
ϣ	š
Λ	s
Υ	u
Χ	x
Υ	n
ΔΔ	p
⊕	ś
⊕	i
⊕	e
⊕	w
∇	k
Π	ú
Η	í
↑	τ
⊕	w

Three of the letters in this table are of particular importance to our understanding of the development of laryngeals in Anatolian under investigation in this paper, namely, the letters transcribed by Melchert as /q/, /x/, and /k/. Adiego (2004:242—245) assigns slightly different values for two of the letters, namely, /k/ = Melchert's /x/ and /k̂/ = Melchert's /k/. Both Adiego and Melchert agree on /q/. Several scholars (Kloekhorst, Schürr, and Simon) have adopted the new values in recent work on Carian and Anatolian, in general — Brosch (no date) provides an excellent summary of the views of these scholars, while Simon (2021) lists the lexical evidence. However, Adiego's arguments in favor of the values he assigns to these letters are highly conjectural and based upon conflicting evidence. When one takes into consideration etymological factors, it can be observed that Carian /k/ (Melchert) ~ /k̂/ (Adiego) corresponds etymologically to /k/ in older Anatolian languages (Hittite, Palaic, and Cuneiform and Hieroglyphic Luwian), while /x/ (Melchert) ~ /k/ (Adiego) corresponds etymologically to /h/ in older Anatolian languages. /q/, on the other hand, appears to represent /x<sup>w</sup>/, just as in Lycian (see footnote 17). In my opinion, this speaks in favor of the values given by Melchert in the above table and against the values assigned by Adiego.

## Proto-Anatolian

In a paper published in *Wekʷos* in 2019 (Bomhard 2019b), I proposed that the Proto-Anatolian stop system be reconstructed as follows:

Stops:	Bilabial	Dental	Velar <sup>24</sup>	Labiovelar
Voiceless aspirated:	/p <sup>h</sup> /	/t <sup>h</sup> /	/k <sup>h</sup> /	/k <sup>wh</sup> /
Glottalized (ejectives): <sup>25</sup>	/pʰ/	/tʰ/	/kʰ/	/kʷʰ/
Plain voiced:	/b/	/d/	/g/	/g <sup>w</sup> /

In addition, the following phonemes must be reconstructed for Proto-Anatolian:

Affricate:	/tʃ <sup>h</sup> /			
Fricatives:	/s/	/x/	/x <sup>w</sup> /	
		/ɣ/	/ɣ <sup>w</sup> /	
Nasals:	/m/	/n/		
Liquids:		/r/, /l/		
Glides:	/w/	/y/		

According to Kimball (2017:249—251), the following vowels are to be reconstructed for Proto-Anatolian (see also Melchert 2017:176; Kloekhorst 2008a:17 — Kloekhorst does not reconstruct Proto-Anatolian \*/æ:/):

/i/, /i:/	/u/, /u:/
/e/, /e:/	/o/, /o:/
/æ:/	/a/, /a:/

I would reconstruct an identical set of vowels for Proto-Anatolian, except for \*/æ:/. Kimball maintains that \*/æ:/ developed from earlier \*e<sub>2</sub> (see also Melchert 2017:176). Kimball does not provide justification for reconstructing \*/o/, \*/o:/ for Proto-Anatolian. However, Melchert (1992:186, 1994:291—294, and 2017:176) justifies the reconstruction of Proto-Anatolian \*/o/, \*/o:/ on the basis of developments in Lycian. Melchert claims that Lycian /e/ comes, in part, from earlier \*/o/ and provides several examples. In my opinion, we are dealing with specific Lycian developments here, inasmuch as there is absolutely no evidence from Cuneiform and Hieroglyphic Luwian for /o/ distinct from /a/, claims to the contrary notwithstanding — the much later Lycian belongs to the Luwian branch of Anatolian. The vowels \*/a/ and \*/o/ merged in Hittite and Palaic (\*a, \*o > a), while \*/e/, \*/a/, and \*/o/ merged in Luwian (\*e, \*a, \*o > a).

<sup>24</sup> The velar series may be assumed to have had non-phonemic palatalized allophones in certain environments (cf. Bomhard 2021.I:117—120). These allophones became phonemic in Luwian (cf. Melchert 2017:176) as well as in several of the non-Anatolian Indo-European daughter languages — the so-called “satəm” languages.

<sup>25</sup> Kloekhorst (2016:226—228) considers this series to have been pre-glottalized in pre-Anatolian.

## Examples

The following select examples illustrate the representation of laryngeals in Anatolian (the forms, meanings, and etymologies are taken from the following: Kimball 1999; Kloekhorst 2008a; Puhvel 1984—; Tischler 1977—; Sturtevant 1951; Melchert 1984 and 1994a — these works, as well as the other etymological dictionaries listed in the references at the end of this paper, must be consulted for additional information). The Hittite, Palaic, Cuneiform Luwian, and Hieroglyphic Luwian forms are given in plene writing:

### 1. \* $\varrho_1$ > $\emptyset$ in Anatolian:

Hittite (1st sg. pres. act.) *e-eš-mi* ‘to be’ (< \* $\varrho_1$ es-mi); Cuneiform Luwian (3rd sg. pres. act.) *a-aš-ti* ‘to be’; Hieroglyphic Luwian (3rd sg. pres. act.) *a-sa-ti*, *á-sa-ti* ‘to be’; Palaic (3rd sg. impvt. act.) *a-aš-du* ‘to be’; Lycian (3rd sg. pres. act.) *esi* ‘to be’ ~ Sanskrit *ásti* ‘to be’; Greek *ἔστί* ‘to be’; Latin *est* ‘to be’; Gothic *ist* ‘to be’; Old Lithuanian *ěsti* ‘to be’; Old Church Slavic *jestъ* ‘to be’.

Hittite (1st sg. pres. act.) *e-id-mi* ‘to eat’ (< \* $\varrho_1$ iet’-mi [\**Hied-mi*]); Palaic (3rd pl. pres. act.) *a-ta-a-an-ti*, *a-da-a-an[-ti]* ‘to eat’; Cuneiform Luwian (3rd pl. impvt. act.) *a-da-an-du* ‘to eat’; Hieroglyphic Luwian (3rd pl. impvt. act.) *á-tà-tu-u* ‘to eat’ ~ Sanskrit *ádmi* ‘to eat, to consume, to devour’; Greek *ἔδω*, *ἔδομαι* ‘to eat, to devour; (of worms) to gnaw’; Armenian *utem* ‘to eat’; Latin *edō* ‘to eat’; Gothic *itan* ‘to eat’; Old Icelandic *eta* ‘to eat’; Norwegian *eta* ‘to eat’; Swedish *äta* ‘to eat’; Old English *etan* ‘to eat’; Old Frisian *eta*, *īta* ‘to eat’; Old Saxon *etan* ‘to eat’; Dutch *eten* ‘to eat’; Old High German *ezzan* ‘to eat’ (New High German *essen*); Lithuanian *ėdu*, *ėsti* ‘to eat’, *ėda* ‘food’; Latvian *ēst* ‘to eat’; Old Prussian *īst* ‘to eat’; Old Church Slavic *jasti* ‘to eat’; Russian *jest’* [естъ] ‘to eat’; Polish *jeść* ‘to eat’; Czech *jísti* ‘to eat’. [Cf. Bomhard 2021.3:781—792, no. 672, Proto-Nostratic root \* $\varrho_1$ it’- (~ \* $\varrho_1$ et’-): (vb.) \* $\varrho_1$ it’- ‘to chew, to bite, to eat, to consume’; (n.) \* $\varrho_1$ it’-a ‘the act of eating; that which is eaten: food, nourishment’.]

Hittite (1st sg. pres. mid.) *e-eš-ḫa-ḫa-ri* ‘to sit down, to seat oneself; to sit; (act.) to sit, to reside; (trans.) to settle’ (< \* $\varrho_1$ ie $\varrho_1$ s-); Hieroglyphic Luwian (3rd pl. pret. act.) <sup>SOLIUM</sup>*á-sa-ta* ‘to be seated, to dwell’, *i-sà-nu-wa/i-* ‘to seat, to cause to sit’, *i-sà-tara/i-tá-* ‘throne’ ~ Sanskrit *āsmi* ‘to sit’ (< \* $\varrho_1$ ie $\varrho_1$ s-mi). [Cf. Bomhard 2021.3:764—765, no. 646, Proto-Nostratic root \* $\varrho_1$ as<sup>v</sup>- (~ \* $\varrho_1$ as<sup>v</sup>-): (vb.) \* $\varrho_1$ as<sup>v</sup>- ‘to put, to place, to set; to sit, to be seated’; (n.) \* $\varrho_1$ as<sup>v</sup>-a ‘place, seat’; (adj.) ‘put, placed, set, established’.]

Hittite (nom.-acc. sg.) *e-eš-ḫar*, *iš-ḫar* ‘blood; bloodshed’ (< \* $\varrho_1$ es $\varrho_2$ r); Cuneiform Luwian (nom.-acc. sg.) *a-aš-ḫar-ša* ‘blood’; Hieroglyphic Luwian *á-sa-ha+ra/i-mi-sà* (n.) ‘blood offering’ ~ Sanskrit *ásrk* ‘blood’ (the Sanskrit form contains an epenthetic *k*); Tocharian A *ysār* ‘blood’; Greek *ἔαρ* ‘blood’; Latin *assyr* ‘blood’. Note: *ḫ* is sometimes missing in Hittite, as in (nom.-acc. sg.) *e-eš-šar* (= *e-eš-ḫar*) and (gen. sg.) *e-eš-na-aš* (= *e-eš-ḫa-na-aš*). According to Kloekhorst (2008:258), these forms represent scribal errors, while Kimball (1999:379—380) considers the loss of *ḫ* in these forms to be an archaism.

Hittite (nom. sg.) *at-ta-aš*, *ad-da-aš* ‘father’ (<  $*\varrho_1at^h t^h a$  [ $*H_1atta$ ]) ~ Greek *ἄττα* ‘daddy’; Latin *atta* ‘father’; Gothic *atta* ‘father’; Old Frisian *aththa* ‘father’; Old High German *atto* ‘father’ (Middle High German *atte*, *ätte* ‘father’); Albanian *atë* ‘father’; Old Church Slavic *otъcb* ‘father’; Russian *otéc* [отѣц] ‘father’; Sanskrit (f.) *attā* ‘mother’ ( $*atta-$  ‘father’ is unattested, but note the following: Assamese *ātā* form of address to a respectable older man; Gujarati *ātāji* ‘grandfather’; Sinhalese *ātā* ‘grandfather’; Sindhi *ado* ‘brother’; Lahndi *addā* ‘father’; etc.). Note: This is a nursery word. Assuming that there was an initial laryngeal here, the only acceptable candidate is  $*\varrho_1$  (cf. Hamp 1965a:136  $*\varrho at(t)-$  ??) — and original  $*a$ . [Cf. Bomhard 2021.3:765—766, no. 647, Proto-Nostratic (n.)  $*\varrho at^h t^h a$  ‘older male relative, father’ (nursery word).]

Hittite (nom.-acc. sg. n.) *a-iš*, *a-i-iš* ‘mouth’ (<  $*\varrho_{10}\varrho_1-es-$ ); Cuneiform Luwian (nom.-acc. sg.) *a-a-aš-ša* ‘mouth’ and, perhaps, (3rd sg. pret.) *a-aš-ša-at-ta* ‘to say’; Hieroglyphic Luwian (3rd sg. pres. act.) *á-saš-za-ta* ‘to speak’ ~ Sanskrit *āś-* ‘mouth’; Latin *ōs* ‘mouth’. Notes: (1) The reconstruction of the Proto-Indo-European form as either  $*h_3oh_1-os-$ ,  $-es-$  (cf. De Vaan 2008:436; Mayrhofer 1986—2001.I:81—82) or  $*h_1oh_3-es-$  (cf. Kloekhorst 2008a:166—167), with  $*\varrho_3$  in either initial or medial position, is impossible since  $*\varrho_3$  is preserved in Hittite. (2) Sturtevant (1951: 36, §61c) reconstructs Proto-Indo-Hittite  $*Aōys$ ,  $*Aysos$  ‘mouth’, while Puhvel (1984—.1/2:15—17) reconstructs Proto-Indo-European (nom.-acc. sg.)  $*A_1^{w}éE_1-es$  (>  $*ōyes$  >  $*āyes$  >  $*āyis$  > Hittite *a-iš*, *a-i-iš*), etc.

Hittite (nom. sg. c.) *a-aš-šu-uš* ‘good; dear; favorable’ (<  $*\varrho_{10}osu-s$  [cf. Melchert 1994:63  $*ōsu-$ ]), (n.) (nom.-acc. sg.) *a-aš-šu* ‘good(ness), good things; goods, possessions’ ~ Greek *εὖς* ‘good, brave, noble’; Sanskrit *sú*, *su-* ‘good’. Note: Kloekhorst (2008:223—225) reconstructs Proto-Indo-European  $*h_1oh_1s-u-$  (?), in part to account for the Greek variant form *ἦς* ‘good, brave’ as if from  $*\varrho_{1e}\varrho_1s-u-$ . However, the initial *ḥ-* in this form is usually attributed to metrical lengthening (cf. Beekes 2010.I:484—485; Chantraine 1968—1980.I:388; Frisk 1970—1973.I: 594—595; Wodtko—Irslinger—Schneider 2008:246, note 6).

Hittite (3rd sg. pres. act.) *pa-a-ši*, *pa-aš-zi* ‘to swallow, to gulp down’ (<  $*p^ho\varrho_1-s-$  [ $*poH_3s-$ ]); Cuneiform Luwian (3rd sg. pret. act.) *pa-aš-ta* ‘to swallow’ ~ Sanskrit (reduplicated) *pībati* ‘to drink’; Greek *πίνω* ‘to drink’; Latin (reduplicated) *bibō* ‘to drink’; Old Church Slavic *piti* ‘to drink’. Note: The Proto-Indo-European root is typically reconstructed as  $*po\varrho_3-$  with  $*\varrho_3$ , the thinking here being that, since  $*\varrho_3$  was a voiced laryngeal, it must be reconstructed here to account for the voicing of medial  $*p$  to  $*b$  in, for example, the Sanskrit and Latin forms cited above. However,  $*\varrho_3$  is preserved in Anatolian, and a laryngeal reflex is missing in both Hittite and Cuneiform Luwian. Now, according to the Glottalic Model of Proto-Indo-European consonantism, the laryngeal in question in this example is not  $*\varrho_3$  but  $*\varrho_1$ , thus avoiding having to reconstruct a laryngeal ( $*\varrho_3$ ) for which there is no evidence in either Hittite or Cuneiform Luwian. The Proto-Indo-European form leading to the Sanskrit and Latin derivatives would thus have been (reduplicated)  $*p^hi-p^h\varrho_1-e-ti$  >  $*pi-be-ti$ , assuming here that  $*\varrho_1$  was a glottal stop ( $*ʔ$ ), which is now the common view (see below), and also assuming, consistent with the tenets of the Glottalic Model, that  $*-p^hʔ-$  >  $*-b-$  (cf. Hopper 1977b:70). [Cf. Bomhard 2021.2:153—155,

no. 124, Proto-Nostratic root  $*p^hu\text{?}$ - ( $\sim *p^ho\text{?}$ ): (vb.)  $*p^hu\text{?}$  ‘to swell, to fatten’; (n.)  $*p^hu\text{?}$ -a ‘swelling, fullness, fat(ness)’.]

Hittite enclitic demonstrative particle (nom. sg.) -aš, (acc. sg.) -an, (n. sg.) -at ‘he, she, it’; (nom. sg. c.) a-ši, a-ši-iš ‘that (one)’, (dat. sg.) e-di, i-di, e-da-ni ‘to or for him, her, it’ ( $< *_{\text{?}}e$ -)  $\sim$  Sanskrit *ayám* ‘this’ (gen. sg. m./n. a-syá, á-sya; f. a-syáh), *idám* ‘this’, (f.) *iyám* ‘she, this’, *á-taḥ* ‘from this, hence’ ( $< *_{\text{?}}e-t^ho-s$  [ $*H_{1e}$ -to-s]), (n.) *e-tát* ‘this, this here’, *ihá* ‘here’, *e-šá* (f. *e-šā*) ‘this’; Old Persian *a-* ‘this’, *aita-* ‘this’, *ima-* ‘this’, *iyam* ‘this’, *idā* ‘here’; Avestan *a-* ‘this’, *aētaṭ* ‘this’, *ima-* ‘this’, *iḍa* ‘here’; Latin *is*, *ea*, *id* ‘he, she, it; this or that person or thing’; Oscan *eiso-* ‘this’; Umbrian (dat. sg.) *esmei* ‘to this, to it’; Old Irish *é* ‘he, they’, *ed* ‘it’; Gothic anaphoric pronoun *is* ‘he’, *ita* ‘it’; Old Icelandic relative particle *es* (later *er*) ‘who, which, what’; Old Saxon *et*, *it* ‘it’; Old High German *er*, *ir* ‘he’, *ez*, *iz* ‘it’; Lithuanian *jìs* ( $< *is$ ) ‘he’. Note: Various extended forms must be reconstructed in Proto-Indo-European to account for developments in the daughter languages:  $*_{\text{?}}e-/*_{\text{?}}io-+-y/i-$   $> *_{\text{?}}ey-/*_{\text{?}}ioy-/*_{\text{?}}i-$ ;  $*_{\text{?}}e-/*_{\text{?}}io-+-t^ho-$ ; etc. [Cf. Bomhard 2021.3: 726—731, no. 614, Proto-Nostratic demonstrative stems (originally deictic particles): proximate  $*_{\text{?}}i-$  ( $\sim *_{\text{?}}e$ ) ‘this’; intermediate  $*_{\text{?}}u-$  ( $\sim *_{\text{?}}o-$ ) ‘that’; distant  $*_{\text{?}}a-$  ( $\sim *_{\text{?}}\partial-$ ) ‘that yonder, that over there’. Note: These stems regularly combined with other deictic particles:  $*_{\text{?}}a/i/u+na-$ ,  $*_{\text{?}}a/i/u+\check{S}a-$ ,  $*_{\text{?}}a/i/u+ma-$ ,  $*_{\text{?}}a/i/u+t^ha-$ ,  $*_{\text{?}}a/i/u+k^ha-$ ,  $*_{\text{?}}a/i/u+ya-$ , etc. already in Proto-Nostratic.]

Hittite (nom. sg.) *an-na-aš* ‘mother’ ( $< *_{\text{?}}ian(n)-o-s$ ); Palaic (nom. sg.) *an-na-aš* ‘mother’; Cuneiform Luwian (nom. sg.) *an-ni-iš*, *a-an-ni-iš* ‘mother’; Lycian (nom. sg.) *ēni* ‘mother’; Lydian (nom. sg.) *ēnaś* ‘mother’  $\sim$  Latin *anna* ‘foster-mother’; (?) Greek (Hesychius) ἀννίς ‘grandmother’. Notes: (1) Hieroglyphic Luwian *MATER-nat/i* ‘mother’ may be read as /anna(i)-/ (cf. Kloekhorst 2008a:174). (2) The Proto-Indo-European ancestor of these forms is regularly reconstructed as  $*_{\text{?}}zen(n)-$  or the like to account for the initial *a-* (cf., for example, Beekes 2010.I:107  $*_{\text{?}}h_{2}en-$  — Kloekhorst 2008a:174 reconstructs Proto-Anatolian  $*Honno-$ ). However, this is a nursery word, for which  $*_{\text{?}}ian(n)-$ , with initial  $*_{\text{?}}i-$  and original  $*a$ , seems to be the most plausible reconstruction. [Cf. Bomhard 2021.3:755—756, no. 636, Proto-Nostratic (n.)  $*_{\text{?}}an^va$  ‘mother, aunt’ (nursery word).]

Hittite (3rd sg. pres. active) *i-ya-(az)-zi*, *i-e-iz-zi* ‘to do, to make, to treat, to beget, to perform (duty, ritual), to celebrate (deity, feast)’ ( $< \text{Proto-Anatolian } *iya-$   $\sim *aya-$   $\sim *ya-$ / $*yē-$  ‘to do, to make, to perform, etc.’  $< *_{\text{?}}i(e)yo-$  originally an interrogative verb stem meaning ‘to do what?, to act in what manner?’, later simply ‘to do, to make, to perform’); Cuneiform Luwian (3rd sg. pres. pass.) *a-a-ya-ri* ‘to make’; Hieroglyphic Luwian *a(i)a-* ‘to make’; Lycian (3rd sg. pres.) *ati* ( $< *ayati$ ) ‘to make’; Lydian *i-* ‘to make’  $\sim$  Tocharian A/B *yām-* ‘to do, to make, to commit, to effect’. [Cf. Bomhard 2021.3:768—769, no. 650, Proto-Nostratic root  $*_{\text{?}}ay-$  ( $\sim *_{\text{?}}\partial y-$ ): interrogative verb stem  $*_{\text{?}}ay-$  ‘to do what?, to act in what matter?’]

Hittite (imptv.) *i-it* ‘go!’ ( $< *_{\text{?}}ey-/*_{\text{?}}ioy-/*_{\text{?}}i-$  ‘to go’); Cuneiform Luwian (3rd sg. pres.) *i-ti* ‘goes’  $\sim$  Greek (1st sg. pres.) εἶμι ‘I go’, (1st pl. pres.) ἴμεν ‘we go’; Sanskrit (1st sg. pres.) *émi* ‘I go’, (3rd sg. pres.) *éti* ‘goes’, (1st pl. pres.) *imāḥ* ‘we go’, (3rd pl. pres.) *yānti* ‘they go’; Avestan (3rd sg. pres.) *aēiti* ‘goes’; Old Persian (3rd sg. pres.) *aitiy* ‘goes’; Latin (1st sg. pres.) *eō* ‘I go’; Old Lithuanian (1st sg.

- pres.) *eĩmi* ‘I go’, (3rd sg. pres.) *eĩti* ‘goes’; Old Church Slavic *idq, iti* ‘to go’; Tocharian A (1st pl.) *ymäs* ‘we go’, B (1st sg.) *yam, yam* ‘I go’. [Cf. Bomhard 2021.3:771—773, no. 652, Proto-Nostratic root *\*ʔay-* (~ *\*ʔay-*): (vb.) *\*ʔay-* ‘to go, to proceed’, (n.) *\*ʔay-a* ‘journey’; also Bomhard 2021.3:793—794, no. 673, Proto-Nostratic root *\*ʔiy-* (~ *\*ʔey-*): (vb.) *\*ʔiy-* ‘to come, to go’, (n.) *\*ʔiy-a* ‘approach, arrival; path, way’.]
- Hittite */\*ekku-/* ‘horse’ (< *\*ʔiekʰu-* [in Anatolian]; *\*H<sub>1</sub>ekʰw-o-s* ‘horse’ [*\*H<sub>1</sub>ékʰuo-*] [in the non-Anatolian daughter languages] [literally, ‘the spirited, violent, fiery, or wild one’]); Cuneiform Luwian */\*āššu-/* ‘horse’; Hieroglyphic Luwian *á-sù-wa-* /*ásu-* ‘horse’; Lycian *esbe-* ‘horse’ ~ Sanskrit *ásva-h* ‘horse’; Avestan *aspa-* ‘horse’; Mycenaean *i-go* (*hiqqʷo-*) ‘horse’; Greek *ἵππος* ‘horse’; Latin *equus* ‘horse’; Old Irish *ech* ‘horse’; Gothic *\*aihva-* ‘horse’ in *\*aihvatundi* ‘bramble, prickly bush’ (literally, ‘horse-thorn’); Old Icelandic *jór* (< *\*eχwar* < *\*eχwaz*) ‘stallion, steed’; Old English *eoh* ‘horse’; Old Saxon *ehu-* ‘horse’ in *ehu-skalk* ‘horse-servant’; Lithuanian (f.) *ašvā* (Old Lithuanian *ešva*) ‘mare’; Tocharian A *yuk*, B *yakwe* ‘horse’, B *yäkwaške* ‘little horse’. Notes: (1) Kloekhorst (2008:237—239) reconstructs Proto-Anatolian *\*ʔekʰu-* ‘horse’. (2) There are no attested *o*-grade forms. (3) The Proto-Indo-European word for ‘horse’ is not in any way, shape, or form related to the Proto-Indo-European word for ‘swift’ (*\*ōku-*, according to Watkins 1985:45). [Cf. Bomhard 2021.3:777—778, no. 658, Proto-Nostratic root (Eurasianic only) *\*ʔekʰ-*: (vg.) *\*ʔekʰ-* ‘to move quickly, to rage; to be furious, raging, violent, spirited, fiery, wild’; (n.) *\*ʔekʰ-a* ‘rapid or violent movement, fury, rage’.]
- Hittite (3rd sg. pres.) *a-ri* ‘to arrive, to come’, (3rd sg. pres.) *a-ra-(a)-i* ‘to (a)rise, to lift, to raise; to (a)rouse’, (3rd sg. pres.) *a-ar-aš-ki-iz-zi* ‘to be arriving’, (3rd sg. pres.) *ar-nu-(uz-)zi* ‘to move along, to make go; to stir, to raise; to transport, to deport, to remove; to bring, to transmit, to deliver, to produce; to further, to promote’, (3rd sg. pres.) *(a-)ar-aš-zi* ‘to flow’ (< *\*ʔior-/ʔiʰ-* ‘to move, to set in motion; to arise, to rise; to raise’) ~ Sanskrit *árṣati* ‘to flow’, *árṇa-h* ‘undulating, surging; wave’, *ṛcchāti* ‘to go, to move, to send’, *ṛṇóti* ‘to go, to move, to arise’; Avestan *ar-* ‘to go, to move, to come’, *aurva-*, *aurvant-* ‘rapid, quick’, *ərənaoiti* ‘to set in motion’; Old Persian *ar-* ‘to move, to go or come toward’, *aruvā* ‘action’, *aruvā-* ‘rapid, quick’; Greek *ὀρνύμι* ‘to urge on, to incite, to move, to stir oneself, to make to arise’; Latin *orior* ‘to rise, to arise’. [Cf. Bomhard 2021.3:798—799, no. 676, Proto-Nostratic root *\*ʔor-*: (vb.) *\*ʔor-* ‘to move rapidly, quickly, hastily; to set in motion’; (n.) *\*ʔor-a* ‘any rapid motion: running, flowing, pouring, etc.’; (adj.) ‘rapid, quick, hasty’; also Bomhard 2021.3:799—800, no. 677, Proto-Nostratic root *\*ʔorʷ-*: (vb.) *\*ʔorʷ-* ‘to rise (up)’, (n.) *\*ʔorʷ-a* ‘rising movement or motion’. Note: Two separate Proto-Nostratic stems have fallen together in Proto-Indo-European: (A) *\*ʔor-* ‘to move rapidly, quickly, hastily; to set in motion’ and (B) *\*ʔorʷ-* ‘to rise (up)’.]
- Hittite (3rd sg. pres. act.) *a-ar-ki* ‘to mount, to copulate (with)’, (nom. pl.) *ar-ki-i-e-eš* ‘testicles’ (< *\*ʔiorgʰ-/ʔiʰgʰ-* ‘to mount, to copulate (with)’, *\*ʔiorgʰi-s* ‘testicle’) ~ Avestan *ərəzi* ‘scrotum’; Greek *ὄρχις* ‘testicle’; Armenian *orjikʰ* ‘testicles’, *orj* ‘male’; Old Irish *uirge* ‘testicle’; Old Icelandic *argr* ‘unmanly, effeminate, cowardly; passive homosexual’, *ergi* ‘lust, lewdness’; Old English *earg* ‘cowardly;

bad, depraved'; Old Frisian *erch* (also *erg*, *arch*) 'angry, evil; wrong, bad, disgraceful; severe (wounds)', *erg* 'mean, cowardly'; Old Saxon *arug* 'mean, cowardly'; Old High German *arg*, *arag* 'mean, cowardly'; Lithuanian *aržùs* 'lusty', *eřžilas* (dial. *ařžilas*) 'stallion'; Albanian *herdhë* 'testicle'. Note: Kloekhorst (2008: 203—204) reconstructs Proto-Indo-European *\*h<sub>3</sub>rǵ<sup>h</sup>-o*, *\*h<sub>3</sub>órǵ<sup>h</sup>ei*, with initial *\*ǵ<sub>3</sub>*. However, the Hittite evidence does not support such a reconstruction. [Cf. Bomhard 2021.3:800—801, no. 678, Proto-Nostratic (vb.) *\*ǵor<sup>v</sup>-* 'to rise (up)': extended forms: (vb.) *\*ǵor<sup>v</sup>-V-g-* 'to climb on, to mount, to copulate (with)'; (n.) *\*ǵor<sup>v</sup>-g-a* 'mounting, copulation'.]

#### Comments:

1. One of the things that I see quite often in the literature involving laryngeals is that theory is allowed to take precedence over evidence, acting as a kind of intellectual “straitjacket” — critical thinking requires that we free ourselves from any and all preconceived notions. This does not mean, however, that every proposal warrants equal consideration, nor does it mean that we suspend sound judgment. Ideas that are patently crackpot should be unequivocally rejected. An example of the approach under discussion here is the Hittite word for ‘mouth’ (*a-iš*, *a-i-iš*) cited above. The thinking here seems to be that non-apophonic *\*o* in Indo-European always implies the presence of *\*ǵ<sub>3</sub>*, even when corroborating Hittite evidence is lacking. Other, more frequent examples involve the reconstruction of *\*ǵ<sub>2</sub>* to indicate the “coloring” of *\*e* to *\*a*, even when corroborating Hittite evidence is lacking. (To his credit, Kuryłowicz got around this latter conundrum quite nicely by positing *\*ǵ<sub>4</sub>* — Sturtevant, Lehmann, Mallory—Adams, and Bomhard, among others, accept Kuryłowicz’s view in this matter.) This approach places the scholars reconstructing these laryngeals in the awkward position of having to explain why the laryngeals in question (*\*ǵ<sub>2</sub>* and *\*ǵ<sub>3</sub>*) are sometimes present in the Hittite data and sometimes not — in other words, of having to specify the conditioning factors leading either to the retention or to the loss of these laryngeals in identical environments. This is rarely, if ever, done, and when explanations are offered, they often seem rather ad hoc. That is not to say that these laryngeals are never lost in Hittite — that is quite a different thing than reconstructing these laryngeals without sufficient evidence. I reject this approach — in my opinion, the evidence should always take precedence over theory and should never be altered to fit the theory. When anomalies occur, they require careful analysis and viable explanations, even if it means amending or abandoning the theory or the faulty reconstructions resulting from the erroneous generalization/application of the theory — as noted by Kimball (1999:386): “Commonly cited examples of loss can usually be explained in other ways”, and she gives several examples to illustrate this point. It should thus be perfectly clear from the examples listed above, as well as the examples listed by Kimball, that credible alternative explanations are almost always available to the questionable reconstructions found in the relevant literature.
2. Returning to the laryngeal under discussion in this section, as we have seen from the examples given above, *\*ǵ<sub>1</sub>* was found in the vicinity of all vowels, *\*e*, *\*a*, *\*o*

- traditionally reconstructed for Proto-Indo-European. Moreover,  $*\mathfrak{z}_1$  did not change the quality of contiguous vowels in any way, shape, or form at the Proto-Indo-European level.
3.  $*o$  and  $*a$  of traditional Proto-Indo-European appear as  $a$  in Hittite and Palaic, while  $*e$ ,  $*o$ , and  $*a$  of traditional Proto-Indo-European appear as  $a$  in Cuneiform and Hieroglyphic Luwian. Further afield, Common Luwian  $a$  appears mostly as  $e$  in Lycian.
  2.  $*\mathfrak{z}_2 > (1) \text{ } \mathfrak{h}\text{-}$  (initially),  $-\mathfrak{h}(\mathfrak{h})\text{-}$  (medially) in Hittite, Palaic, Cuneiform Luwian, and Hieroglyphic Luwian (written  $h\text{-}$ ,  $-h(h)\text{-}$ );  $> (2) \text{ } \chi\text{-}$  (initially),  $-\chi\text{-}/-g\text{-}$  (medially),  $-q\text{-}$  ( $*/x^w/$ ) in Lycian:

Hittite (nom. sg.)  $hu\text{-}u\mathfrak{h}\text{-}\mathfrak{h}a\text{-}a\mathfrak{s}$  ‘grandfather’ ( $< *\mathfrak{z}_2ew\mathfrak{z}_2os$ ); Cuneiform Luwian (abl.-instr.)  $hu\text{-}u\text{-}\mathfrak{h}a\text{-}ti$  ‘grandfather’, also found in the anthroponyms  $Hu\mathfrak{h}\mathfrak{h}azitis$ ,  $Hu\mathfrak{h}anani\mathfrak{s}$  (not in Kloekhorst, but cf. Puhvel 1984 — .3:355—358); Hieroglyphic Luwian (nom. pl.)  $^{AVUS}hu\text{-}ha\text{-}zi$  ‘grandfather’; Lycian  $\chi uga\text{-}$  ‘grandfather’, also found in the anthroponyms  $Ep\mathfrak{n}\chi u\chi a$  and  $Kov\gamma a\varsigma$  — Melchert (1994a:289) considers the second  $\chi$  in the name  $Ep\mathfrak{n}\chi u\chi a$  to be secondary; perhaps Carian  $quq\text{-}$  ‘grandfather’ ~ Latin *avus* ‘grandfather’; Old Irish *áue* ‘grandson’; Armenian *haw* ‘grandfather’; Gothic *awō* (f.) ‘grandmother’. Note: According to Kloekhorst (2008:353):

Since Sturtevant (1928c: 163), these words are generally connected with Lat. *avus*, Arm. *haw*, etc. ‘grandfather’. It is clear that Lat. *a-* and Arm. *ha-* must reflect  $*h_2e\text{-}$ , which corresponds to Hitt.  $\mathfrak{h}\text{-}$ . The second  $-\mathfrak{h}\mathfrak{h}\text{-}$  in Hittite corresponds to the acute intonation in SCr. *ŭjāk* which points to a laryngeal. Since  $*h_3$  was lost intervocally (cf. Melchert 1987b: 23f), it is likely that we must reconstruct  $*h_2$  here as well. Thus, we arrive at  $*h_2euh_2\text{-}$ . The question remains why Hittite shows geminated  $-\mathfrak{h}\mathfrak{h}\text{-}$  where the Luwian languages show single  $-\mathfrak{h}\text{-}$ . In my view, this problem can only be solved by assuming that this word originally was a root noun. If we reconstruct  $*h_2éuh_2\text{-}s$ ,  $*h_2éuh_2\text{-}m$ ,  $*h_2uh_2\text{-}ós$ , we can explain that on the one hand we find the thematicized stem  $*h_2éuh_2\text{-}o\text{-}$  in CLuw.  $hū\mathfrak{h}a\text{-}$ , Lyc.  $\chi uge\text{-}$ , and also Lat. *avus*, Arm. *haw*, Goth. *awo*, etc., but on the other a thematicized stem  $*h_2uh_2\text{-}ó\text{-}$  which regularly yields Hitt.  $hu\mathfrak{h}\mathfrak{h}a\text{-}$  without lenition of  $*\text{-}h_2\text{-}$ . Compare  $\mathfrak{s}ū\mathfrak{h}\mathfrak{h}\text{-}$ ,  $\mathfrak{s}u\mathfrak{h}\mathfrak{h}a\text{-}$  for a similar thematicization.

- It should be noted, however, that medial single writing of  $\mathfrak{h}$  is also found in Hittite in the derivatives (nom. pl.)  $hu\text{-}u\text{-}\mathfrak{h}a\text{-}an\text{-}te\text{-}i\mathfrak{s}$  (alongside  $hu\text{-}u\mathfrak{h}\text{-}\mathfrak{h}a\text{-}an\text{-}te\text{-}i\mathfrak{s}$ , with medial double writing) ‘(great)grandfather’ and (nom.-acc. pl. n.)  $hu\text{-}u\text{-}\mathfrak{h}a\text{-}da\text{-}al\text{-}la$  ‘grandfatherly’ (this is probably a Luwian form, cf. Melchert 1993b:71). In view of these Hittite forms, as well as the Luwian anthroponyms cited above, Kloekhorst’s conjecture cannot be considered the final word on this matter. [Cf. Bomhard 2021. 3:860—861, no. 729, Proto-Nostratic (n.)  $*haw\text{-}a$  ‘a relative on the mother’s side’.]
- Hittite (nom.-acc. sg.)  $pa\text{-}a\mathfrak{h}\text{-}\mathfrak{h}ur$ ,  $pa\text{-}a\mathfrak{h}\text{-}\mathfrak{h}u\text{-}ur$ ,  $pa\text{-}a\text{-}a\mathfrak{h}\text{-}\mathfrak{h}u\text{-}ur$  ‘fire’ ( $< *p^he\mathfrak{z}_2\text{-}ur$  [ $*peh_2\text{-}wr$ : Adams, Kimball, Melchert, Yates], [ $*peh_2\text{-}ur$ : Kloekhorst], [ $*péxwr$ : Sturtevant]); Cuneiform Luwian (nom.-acc. sg.)  $pa\text{-}a\text{-}\mathfrak{h}u\text{-}u\text{-}ur$  ‘fire’ and, perhaps, (3rd sg. pret.)  $pa\text{-}wa\text{-}ar\text{-}it\text{-}ta$  ‘to light a fire’, without  $-\mathfrak{h}\text{-}$  ~ Greek  $\pi\tilde{u}\rho$  ‘fire’;



Armenian *hur* ‘fire’; Old Icelandic *fýrr*, *fúrr* ‘fire’; Old English *fȳr* ‘fire’; Tocharian A *por*, B *pūwar* ‘fire’. [Cf. Bomhard 2021.3:160—161, no. 130, Proto-Nostratic root *\*p<sup>h</sup>aḥ-* (~ *\*p<sup>h</sup>əḥ-*): (vb.) *\*p<sup>h</sup>aḥ-* ‘to warm, to heat, to burn’; (n.) *\*p<sup>h</sup>aḥ-a* ‘fire, flame, spark’; extended forms: (vg.) *\*p<sup>h</sup>aḥ-V-w-* ‘to warm, to heat, to burn’; (n.) *\*p<sup>h</sup>aḥ-w-a* ‘fire, flame, spark’.] Notes: (1) Kloekhorst (2008:613—614) speculates that a labialized laryngeal may be involved here: *\*páH<sup>w</sup>r*, *\*paH<sup>w</sup>énas*. (2) The Luwian verb *pa-wa-ar-it-ta* ‘to light a fire’ may not be derived from or in any way related to *pa-a-ḫu-u-ur* ‘fire’. It may tentatively be compared with Greek φαύζειν ‘to roast, to fry, to parch’ and φαῦσιγξ ‘blister from burning, any blister’, provided these are not Pre-Greek loans (cf. Beekes 2010.II:1559). Boisacq (1950:1018), on the other hand, assumes Indo-European origin for the Greek forms cited here and compares φωίς ‘blister on the skin, caused by a burn’ (< *\*bhōu-*). Hofmann (1966:393) agrees with Boisacq. However, this etymology is rejected by Chantraine (1968—1980.II:1183), but later, Chantraine (1968—1980.II:1036) reconstructs *\*bhō-w-* as the source of Greek (f. pl.) φωιδες ‘blisters’. Frisk (1970—1973.II:998 and II:1057) does not really clarify the situation. Finally, Mann (1984—1987:68) brings in Low German *bäuten* ‘to make fire’ (pt. *bödd*, pp. *bött*) (cf. Middle Low German *boten*, *buten* ‘to make fire’; East Frisian *böten* ‘to make fire, to heat’) and reconstructs Proto-Indo-European *\*bhaudō*, *-iō* ‘(to make) fire, (to) burn’ (> Proto-Germanic *\*bautan* ‘to make fire’). On the basis of the above forms from Cuneiform Luwian, Greek, and West Germanic, we can cautiously reconstruct a Proto-Indo-European stem *\*b<sup>h</sup>eḡ<sub>4</sub>-w/u-*/*\*b<sup>h</sup>oḡ<sub>4</sub>-w/u-* ‘to light a fire’—an extended form of the root *\*b<sup>h</sup>eḡ<sub>4</sub>-*/*\*b<sup>h</sup>oḡ<sub>4</sub>-* (> *\*b<sup>h</sup>ā-*/*\*b<sup>h</sup>ō-*) (not *\*ḡ<sub>2</sub>*) ‘to be bright, shining; to bring to light, to cause to appear; to make clear’ found in: Sanskrit *bhāti* ‘to shine, to be bright, to be luminous; to be splendid or beautiful; to be conspicuous or eminent; to appear, to seem; to show one’s self, to manifest any feeling; to be, to exist’; Avestan *bānu-* ‘splendor’; Greek φάω ‘to give light, to shine’, φᾶνός ‘light, bright, joyous’, φαίνω ‘to bring to light, to cause to appear; to make known, to reveal, to disclose; to make clear; to show forth, to display; to set forth, to expound; to inform against one, to denounce; to give light, to shine; to come to light, to be visible, to appear; to come into being; to come about; to appear to be’, φάος, φῶς ‘light, daylight; light of the eyes’ (pl. φάεα ‘eyes’); Old Irish *bán* ‘white’; Old English *bōnian* ‘to polish’; New High German *bohlen* ‘to polish, to wax (floor)’ (cf. Rix 2001:68—69 *\*b<sup>h</sup>eh<sub>2</sub>-*/*\*b<sup>h</sup>h<sub>2</sub>-* ‘to glisten, to shine’; Pokorny 1959:104—105 *\*bhā-*, *\*bhō-*, *\*bhə-* ‘to glisten’; Walde 1927—1932.II:122—123 *\*bhā-*; Mallory—Adams 1997:513 *\*bheh<sub>2</sub>-* ‘to shine’; Wodtko—Irslinger—Schneider 2008:7—11 *\*b<sup>h</sup>eh<sub>2</sub>-*; Watkins (ed.) 2000:7 *\*bhā-* ‘to shine’ (oldest form *\*bheḡ<sub>2</sub>-*, colored to *bhaḡ<sub>2</sub>-*, contracted to *\*bhā-*); Chantraine 1968—1980.II:1168—1170 *\*bhā-* (= *\*bheḡ<sub>2</sub>-*) and II:1170—1172; Boisacq 1950:1010—1011 *\*bhā-* and 1014—1015; Hofmann 1966:389—390 *\*bhā-*; Frisk 1970—1973.II:992—994 and II:989—991; Beekes 2010.II:1545—1546 *\*bheh<sub>2</sub>-* ‘to light, to shine’, II:1551—1552; Mayrhofer 1956—1980.II:493—494 *\*bhā-*). Needless to say, this is all quite speculative. [Cf. Bomhard 2021.2:18—19, no. 13, Proto-Nostratic root *\*bah-* (~ *\*bāh-*): (vb.) *\*bah-* ‘to shine’; (n.) *\*bah-a* ‘brilliance, brightness, splendor, beauty; light’; (adj.) ‘shining, bright, radiant’.]

Hittite (1st sg. pres. act.) *pa-aḥ-ḫa-aš-ḫi*, (1st sg. pres. mid.) *pa-aḥ-ḫa-aš-ḫa* ‘to protect, to guard, to defend; to observe (agreements), to keep (oaths), to obey (commands), to keep (a secret)’ (< \**p<sup>h</sup>eḫ<sub>2</sub>s-* [\**peH<sub>2</sub>s-*]); (with medial single writing) (1st sg. pres. act.) *pa-aḥ-ša-nu-mi* (causative); (?) Cuneiform Luwian (3rd sg. impvtv.) *pa-ad-du* ‘to protect’ (meaning uncertain), without a laryngeal ~ Sanskrit (Vedic) *pāti* ‘to protect, to preserve, to keep’; Tocharian A *pās-*, B *pāsk-* ‘to guard, to protect; to practice (moral behavior), to obey (rules)’, B *-pāšše* ‘behavior’. Notes: (1) The Anatolian forms are also commonly compared with the following: Latin *pāscō* ‘to cause to eat, to feed, to pasture, to drive to pasture’; Old Church Slavonic *pasti* ‘to pasture, to feed, to herd’; Serbo-Croatian *pāsti* ‘to pasture, to look after’. (2) Kloekhorst points out that the form (1st pres. act.) *pa-aḥ-ḫa-aš-mi* occurs only once. He assumes that the active verb originally belonged to the *ḫi*-conjugation. [Cf. Bomhard 2021.2:100—101, no. 84, Proto-Nostratic root \**p<sup>h</sup>aḥ-* (~ \**p<sup>h</sup>əḥ-*): (vb.) \**p<sup>h</sup>aḥ-* ‘to eat’; (n.) \**p<sup>h</sup>aḥ-a* ‘food, nourishment’].

Hittite (3rd sg. pres. act.) *la-a-ḫu-i*, *la-a-ḫu-u-i*, *la-ḫu-i*, *la-a-ḫu-wa-i*, etc.; also *la-aḥ-ḫu-uz-zi*, *la-ḫu-uz-zi*, etc. ‘(tr.) to pour, to cast (objects from metal); (intr.) ‘to (over)flow’; (nom. sg.) *la-aḥ-ḫu-uš* ‘container’, (instr. sg.) *la-aḥ-ḫu-e-eš-ni-it* ‘pouring cup’ (< \**leḫ<sub>2</sub>-w/u-*/\**loḫ<sub>2</sub>-w/u-*); Cuneiform Luwian (1st sg. pret. act.) *la-ḫu-ni-i-ḫa* ‘to wash away’; (without *ḫ*) (part.) *la-a-ú-na-i-mi-iš()*, *la-ú-na-i-[mi-š()]* ‘poured’, (3rd pl. pret.) *lu-u-wa-an-da* ‘to pour’, (2nd sg. impv.) *li-lu-u-wa(-a)* ‘pour!’ ~ Greek ληνός (Doric λᾶνός) ‘anything shaped like a tub or a trough: a wine-vat, a trough (for watering cattle), a watering place’ (< \**lā-no-s* < \**leḫ<sub>2</sub>-no-s*). Note: The Anatolian forms are not related to Greek λούω ‘to wash, to bathe’, Latin *lavō* ‘to wash, to bathe’, etc., which must be derived from Proto-Indo-European \**lewḫ<sub>2</sub>-*/\**lowḫ<sub>2</sub>-* ‘to wash, to bathe’ (cf. Kloekhorst 2008a:512—513). [Cf. Bomhard 2021.3:1143, no. 946, Proto-Nostratic root \**laḥ-* (~ \**ləḥ-*): (vb.) \**laḥ-* ‘to make flow, to pour, to moisten, to wet’; (n.) \**laḥ-a* ‘flowing, pouring; moistness, wetness’].

Hittite (nom. sg.) *ḫa-at-ta-an-za* (< \**ḫakt-ant-*) ‘intelligent, clever, wise’, *ḫattahḫ-* ‘to make clever, to instruct’, (nom. sg.) *ḫa-at-ta-a-tar* ‘intelligence, (wise) counsel, wisdom’ (< \**ḫ<sub>2</sub>ek<sup>h</sup>-t<sup>h</sup>-* [\**H<sub>2</sub>ek-t-*]) ~ Gothic *aha* ‘mind, understanding’, *ahjan* ‘to think’, *ahma* ‘spirit’, \**ahmateins* ‘inspiration’, \**ahmeins* ‘spiritual’; Old Icelandic *ætla* (< \**aḫtilōn*) ‘to think, to mean, to suppose’, *ætlan* ‘thought, meaning, opinion’; Old English *eaht* ‘council, deliberation, consideration’, *eahtian* ‘to watch over, to hold council, to deliberate, to consider’; Old Frisian *achte* ‘consideration’, *achtia* ‘to consider’; Old High German *ahta* ‘consideration’ (New High German *Acht*), *ahtōn* ‘to consider’ (New High German *achten*). Notes: This etymology is taken from Puhvel 1984— .3:260—263. [Cf. Bomhard 2021.3:831—832, no. 705, Proto-Nostratic root \**ḫak<sup>h</sup>-* (~ \**ḫək<sup>h</sup>-*): (vb.) \**ḫak<sup>h</sup>-* ‘to be mentally sharp, keen’; (n.) \**ḫak<sup>h</sup>-a* ‘wisdom, sound judgment, understanding’].

Hittite (gen. sg.) *ḫal-lu-wa-aš* ‘hollow, pit’, (gen. sg.) *ḫal-lu-u-wa-aš* ‘hollow, deep’, (denominative verb, 3rd sg. pret. act.) *ḫal-lu-wa-nu-ut* ‘to put down (deep), to lower, to let deteriorate’ (< \**ḫ<sub>2</sub>el-wo-*) ~ Latin *alvus* ‘belly, womb’, *alveus* ‘a hollow, cavity’. Note: This etymology is taken from Puhvel 1984— .3:47—49.

[Cf. Bomhard 2021.3:839, no. 712, Proto-Nostratic (n.) *\*haly-a* ‘hole, hollow, cavity’.]

Hittite (reduplicated) (1st sg. pres. act.) [*h*]a-ma-an-ga-a<sub>h</sub>-*hi*, *ha-ma-an-ga-mi* ‘to tie, to bind, to betroth’ (< *\*ham-ang-* < *\*han-ang-*, through dissimilation [cf. Greek ἀνάγκη ‘force, constraint’, ἀναγκάζω ‘to force, to compel; to constrain’]) (< *\*ǵ<sub>2</sub>eng<sup>h</sup>-*) ~ Sanskrit *aṁhú-h* ‘narrow’; Greek ἄγγω ‘to compress, to press tight; to strangle’; Latin *angō* ‘to press tightly; to strangle, to throttle; to hurt, to distress’, *angor* ‘mental distress, anguish, trouble’; Gothic *aggwus* ‘narrow’; Old Icelandic *öng* ‘narrow’; Old English *enge* ‘narrow; causing anxiety, painful, severe’; Old Saxon *engi* ‘narrow’; Dutch *eng* ‘narrow’; Old High German *angi*, *engi* ‘narrow’ (New High German *eng* ‘narrow, cramped, tight, confined’); Old Church Slavic *qzъ-kъ* ‘narrow’; Lithuanian *aĩkštas* ‘narrow, cramped, tight’. [Cf. Bomhard 2021.3:845—847, no. 717, Proto-Nostratic root *\*han-* (~ *\*hən-*): extended form: (vb.) *\*han-V-g-* ‘to tie tightly, to constrict, to make narrow; to choke, to strangle’; (n.) *\*han-g-a* ‘throat’; (adj.) ‘narrow, constricted’.]

Hittite (n.) (nom. sg.) *ha-ap-pí-na-az* ‘wealth’; (adj.) (nom. sg.) *ha-ap-pí-na-an-za* ‘wealthy, rich’ (< *\*ǵ<sub>2</sub>op<sup>h</sup>-en-o-* [*\*H<sub>3</sub>ep-en-o-*]); Cuneiform Luwian *ha-ap-pí-na-at-ta-an-za* ‘wealth, riches’ ~ Sanskrit *ápnas-* ‘possession, property’; Avestan *afnah-vant-* ‘rich in possessions’; Latin *opulens* (< *\*open-ont-*) ‘rich, wealthy’, *ops* ‘might, power’, *opēs* ‘resources, means, wealth’, *Ops* ‘the goddess of abundance’. Note: Proto-Indo-European *\*ǵ<sub>2</sub>op<sup>h</sup>-* probably originally meant ‘to gather, to collect’, specifically, ‘to gather wealth’. [Cf. Bomhard 2021.3:848—850, no. 719, Proto-Nostratic root *\*hap<sup>h</sup>-* (~ *\*həp<sup>h</sup>-*): (vb.) *\*hap<sup>h</sup>-* ‘to take, gather, or collect (with the hands or arms)’; (n.) *\*hap<sup>h</sup>-a* ‘that which has been gathered or collected: plenty, fullness, abundance, wealth, possessions, property; embrace, armful, handful’.]

Hittite (3rd sg. pres. act.) *har-aš-zi* ‘to till (the soil)’, (nom.-acc. sg.) *har-ša-u-wa-ar*, *har-ša-a-u-ar* ‘tilled land’ (< *\*ǵ<sub>2</sub>er(ǵ)-*) ~ Greek ἀρόω ‘to plow’; Latin *arō* ‘to plow’; Old Irish *airim* ‘to plow’; Gothic *arjan* ‘to plow’; Old Icelandic *erja* ‘to plow’; Old English *erian* ‘to plow’, *ierp* ‘plowing’; Old High German *erran* ‘to plow’; Lithuanian *ariù*, *árti* ‘to plow, to till’; Old Church Slavic *ralu* ‘a plow’, *orjō*, *orati* ‘to plow’; Tocharian A *āre* ‘a plow’. Note: Kloekhorst (2008:312—314) reconstructs Proto-Indo-European *\*h<sub>2</sub>ór<sup>h</sup><sub>3</sub>-s-ei* / *\*h<sub>2</sub>rh<sub>3</sub>-s-énti*. [Cf. Bomhard 2021.3:854—856, no. 724, Proto-Nostratic root *\*har-* (~ *\*hər-*): (vb.) *\*har-* ‘to scratch, to scrape’ (> ‘to plow’ in the daughter languages); (n.) *\*har-a* ‘scraping, scratching’.]

Hittite (acc. sg.) *ha-aš-ša-an* ‘hearth’, (nom. sg.) *ha-a-aš*, *ha-aš-ša-aš* ‘ash(es); soda ash, potash, soap’ (< *\*ǵ<sub>2</sub>es-*) ~ (?) Greek ἄζω ‘to be dry’; Latin *āra* ‘altar’ (Old Latin *āsa*); Umbrian (dat. sg.) *ase* ‘altar’; Gothic *azgō* ‘cinder, ashes’; Old Icelandic *aska* ‘ashes’; Swedish *aska* ‘ashes’; Danish *aske* ‘ashes’; Old English *asce*, *æsce* ‘ashes’; Dutch *asch* ‘ashes’; Old High German *asca* ‘ashes’ (New High German *Asche*); Czech *ozd* ‘parched malt’, *ozditi* ‘to dry malt’; Tocharian B *ās-* ‘to become dry, to dry out, to dry up, to parch’, *asāre* ‘dry’. Notes: (1) Kloekhorst (2008:318—319 and 322—323) reconstructs Proto-Indo-European *\*h<sub>2</sub>éh<sub>1</sub>-s-* to account for the long initial *ā* in Latin (and Hittite), while acknowledging that a short initial *ǎ* is found in the Germanic cognates. However, Lindeman (1997:57) points out that

- lengthened-grade is also possible ( $*\mathfrak{z}_2\bar{e}s-$  [phonetically  $*\mathfrak{z}_2\bar{a}s-$ ]). (2) Boisacq (1950: 16) and Frisk (1970—1973.I:25—26) derive Greek ἄζω ‘to be dry’ from  $*azd-$ , extended form of  $*\bar{a}s-$ , while Beekes (2010.I:26—27), among others, derives it from  $*h_2ed-$ . [Cf. Bomhard 2021.3:856—858, no. 726, Proto-Nostratic root  $*\bar{h}as-$  ( $\sim *h\bar{a}s-$ ): (vb.)  $*\bar{h}as-$  ‘to burn, to be hot’; (n.)  $*\bar{h}as-a$  ‘cinder, ember, ashes; heat’.]
- Hittite (nom. sg.)  $^{(GIS)}ha-a\bar{s}-\bar{s}i-ka_4-a\bar{s}$ ,  $^{(GIS)}ha-\bar{s}i-ik-ka_4-a\bar{s}$  ‘a tree and its fruit’ ( $< *z_2es-$ ,  $*z_2\bar{o}s-$ )  $\sim$  Greek ὀξύη ( $< *o\sigma k[\varepsilon]\sigma-$  ?) ‘a kind of beech-tree’; Armenian *haçi* ‘ash-tree’; Albanian *ah* ( $< *osk\bar{a}$ ) ‘beech-tree’, *ashe* ‘holly’; Ligurian Ὀσκίλα ‘ash forest’; Latin *ornus* ( $< *os-en-os$ ) ‘mountain-ash’; Old Irish (*h*)*uinn-ius* ‘ash-tree’; Welsh *onn-en* ‘ash-tree’; Breton *ounn-enn* ‘ash-tree’; Old Icelandic *askr* ‘ash-tree’, *eski* ‘ashen box’; Swedish *ask* ‘ash-tree’; Old English *æsc* ‘ash-tree’; North Frisian *esk* ‘ash-tree’; Dutch *esch* ‘ash-tree’; Old High German *ask* ‘ash-tree’ (New High German *Esche*); Old Prussian *woasis* ‘ash-tree’; Lithuanian *úosis* ( $< *o\bar{s}-$ ) ‘ash-tree’; Russian *jásen’* [ясе́нь] ‘ash-tree’. [Cf. Bomhard 2021.3:858—859, no. 727, Proto-Nostratic root  $*\bar{h}as^y-$  ( $\sim *h\bar{a}s^y-$ ) (used as the base to designate various tree names): (n.)  $*\bar{h}as^y-a$  ‘a tree and its fruit’.]
- Hittite (nom. sg.) *ha-tu-ga-aš* ‘terrible, baleful, fearsome, awesome’, (nom.-acc. sg.) *ha-tu-ga-tar* ‘terror, awesomeness’, (3rd sg. pres. act.) *ha-tu-ki-iš-zi* ‘to become terrible’, (3rd pl. pres. act.) (?) *ha-tu-ga-nu-wa-an-[zi]* ‘to terrify’ ( $< *z_2(e)t-$ ,  $*z_2(e)t’-$  [ $*H_2(e)d-$ ,  $*H_2(e)d’-$ ]  $\sim$  Greek ὀδύσσομαι ‘to be wroth against, to be angry with, to hate’, Ὀδυσσεύς ‘Ulysses, Odysseus’ ( $<$  ‘Fearsome’); Latin *ōdī* ‘to hate’, *ōdium* ‘hatred, grudge, ill will, animosity, enmity, aversion’, *odiōsus* ‘hateful, odious, vexatious, offensive, unpleasant, disagreeable, annoying, troublesome’; Armenian *ateam* ‘to hate’, *ateli* ‘hated, hostile’; Crimean Gothic *atochta* ‘bad’; Old Icelandic *atall* ‘fierce’; Old English *atol* ‘terrible, dire, loathsome, horrid’; Breton *æz* ‘horror’, *æzi* ‘to be terrified’. Note: Kloekhorst (2008:336—337) compares Greek ἀτύζομαι ‘to be distraught from fear, bewildered; to be distraught with grief; to be amazed at; to strike with terror or amazement’ instead. Beekes (2010.1:167) supports Kloekhorst’s etymology. However, as noted by Kloekhorst, *-t-* is never written double in Hittite. In my opinion, this speaks in favor of the alternative etymology given above and supported by Puhvel (1984— .3:274—277) and suggests that Greek ἀτύζομαι may be a later borrowing and not inherited from Proto-Indo-European. [Cf. Bomhard 2021.3:859—860, no. 728, Proto-Nostratic root  $*\bar{h}at-$  ( $\sim *h\bar{a}t-$ ): (v.) (vb.)  $*\bar{h}at-$  ‘to shake, to tremble; to be shaken, startled, frightened, terrified, afraid’; (n.) (n.)  $*\bar{h}at-a$  ‘trembling, shaking’.]
- Hittite (3rd sg. pres.) *hi-in-ik-zi*, *hi-in-ga-zi*, *hi-ni-ik-zi* ‘to present, to deliver, to offer, to allot’ ( $< *z_2ink^h-$  [ $*H_2nek^h-$ ])  $\sim$  Sanskrit *aśnóti* ‘to reach, to come to, to arrive at, to get, to obtain; to master, to become master of; to offer’; Latin *nancior* ‘to get, to obtain’, *nanciscor* ‘to get, to gain, to receive, to meet’; Tocharian A *ents-*, B *enk-* ‘to seize, to take’, B *enkalñe* ‘grasping or clinging to existence; assumption, taking to oneself’, B *enkäl* ‘feeling, passion’. The following may belong here as well: Hittite (nom.-acc. sg.) *he-en-ka-an*, *hi-in-kán*, *hi-in-ga-an*, *he-e-en-kán* ‘death, doom, deadly disease, plague’. Note: I assume that, not only did  $*\mathfrak{z}_2$  lower a contiguous  $*e$  to  $*a$  in Proto-Indo-European, it also lowered a contiguous  $*i$  to  $*e$  and a contiguous  $*u$  to  $*o$  (cf. Bomhard 2021.1:73—75). This explains examples

- of *he-* and *-eh(h)-* in Hittite, where *h* < \* $\text{ḫ}_2$ . It appears that these changes were still in progress at the time when the Anatolian branch separated from the main speech community, as evident in the fluctuation between *hi-* and *-ih(h)-* and *he-* and *-eh(h)-* in Hittite (cf. Kloekhorst 2008a:339—340: “Already in the oldest texts (OS and OH/MS) we find spellings *hi-in-k°*, *he-en-k°*, *hé-en-k°* besides each other”; Puhvel 1984— .3:296—300). The contrary theory, according to which *e* became *i* in this environment, is phonetically improbable, regardless of what may have happened elsewhere. An important point needs to be made here: \**i* and \**u* had more than one origin in Proto-Indo-European. In some cases, \**i* and \**u* were original (that is to say, they were inherited from Proto-Nostratic), while, in other cases, they resulted from the stress-conditioned weakening of \**ey*/\**oy* (or \**ye*/\**yo*) and \**ew*/\**ow* (or \**we*/\**wo*), respectively. Only original \**i* and \**u* were lowered to \**e* and \**o*, respectively, when contiguous with \* $\text{ḫ}_2$ . When \**i* and \**u* resulted from the stress-conditioned weakening of \**ey*/\**oy* (or \**ye*/\**yo*) and \**ew*/\**ow* (or \**we*/\**wo*), however, they were not lowered to \**e* and \**o*, respectively, under the influence of \* $\text{ḫ}_2$ , since such a change would have disrupted the integrity of the ablaut relationship. On the other hand, it is possible to envision a scenario in which \* $\text{ḫ}_2$  originally did have an assimilatory effect on \**i* and \**u* resulting from the stress-conditioned weakening of \**ey*/\**oy* (or \**ye*/\**yo*) and \**ew*/\**ow* (or \**we*/\**wo*) as well, but where \**i* and \**u* were later analogically restored. No doubt, we are dealing with chronologically distinct developments here, with ablaut being older. [Cf. Bomhard 2021.3:870—871, no. 736, Proto-Nostratic root \**hin-* (~ \**hen-*): extended form: (vb.) (vb.) \**hin-V-k<sup>h</sup>* ‘to reach, to come to, to arrive at, to gain; to offer, to present’; (n.) \**hin-k<sup>h</sup>-a* ‘gain, mastery, experience; offering, present’.]
- Hittite (nom.-sg.) *ha-an-za* ‘front, front part’, (nom. sg.) *ha-an-te-iz-zi-iš* ‘forward, front, first; first-born, earliest; foremost’, *ha-an-ti* ‘in front of, before’ (< \* $\text{ḫ}_2ent^h$ - [\**H<sub>2</sub>ent-*]); Cuneiform Luwian (nom. sg.) *ha-an-te-le-eš* ‘first, foremost’, (acc. sg.) *ha-an-da-wa-te-en* ‘leader, chief’; Hieroglyphic Luwian *hant-* ‘face, forehead’, *hantil(i)-* ‘first, former’, *hanti* ‘against’; Lycian (3rd sg. pret. act.) *χñtawate*, *χñtewete* ‘to lead, to direct, to rule’, *χñtawata-* ‘leader, chief’ ~ Sanskrit *ánti* ‘before’, *ántya-h* ‘last (in time, place, or order)’, *ánta-h* ‘end, limit, boundary’; Greek *ἀντί* ‘opposite’, *ἄντα* ‘over, against, face to face’; Latin *ante* ‘before’; Oscan *ant* ‘till’; Gothic *and* ‘along, throughout, towards’, *andeis* ‘end’; Old Icelandic (prefix) *and-* ‘opposite, against, towards’, *endi*, *endir* ‘end’, *endr* ‘in times past, formerly’, *enda* ‘to end, to bring to an end’; Old English (prefix) *and-*, *ond-* ‘opposite, against, towards’, *ende* ‘end, limit, border’; Old Frisian *enda* ‘end’; Old Saxon (prefix) *and-*, *ant-* ‘opposite, against, towards’, *endi* ‘end’; Dutch *einde* ‘end’; Old High German (prefix) *ant-*, *int-*, *ent-* ‘opposite, against, towards’ (New High German *ant-*, *ent-*), *anti*, *enti* ‘end’ (New High German *Ende*); Lithuanian *añt* (earlier *antà*) ‘on, upon’; Tocharian A *ānt*, B *ānte* ‘surface, forehead’. [Cf. Bomhard 2021.3:911—913, no. 774, Proto-Nostratic (n.) \**xaṇ-t<sup>h</sup>-a* ‘the most prominent or foremost (person or thing), front, front part’.]
- Hittite (3rd sg. pres.) *hu-ul-la-a-i* ‘to smite, to destroy’, (ptc.) *hu-ul-hu-li-ya-an-te-eš* ‘smitten’, *hu-ul-la-an-za-iš* ‘battle’ (< \* $\text{ḫ}_2ul-$ ) ~ Greek *ὄλλωμι* ‘to destroy, to make an end of’, *ὄλεθρος* ‘ruin, destruction, death’; Latin *ab-oleō* ‘to destroy’. Note: So

far as I can determine, this etymology was first suggested by Couvreur (1937: 144—146), but it was subsequently rejected by most other scholars on the basis of the difference between the stem vowels of Hittite, on the one hand, and Greek and Latin, on the other hand — Cowgill (1965:146—147 and 157), for one, accepts the comparison of the Hittite and Greek and Latin forms. However, this comparison can be revived if we consider the original form to have been *\*ǵul-*, which later became *\*ǵol-*, with *\*-o-* from earlier *\*-u-* under the influence of the preceding laryngeal. [Cf. Bomhard 2021.1:74 and 3:876—877, no. 741, Proto-Nostratic root *\*hul-* (~ *\*hol-*): (vb.) *\*hul-* ‘to destroy, to lay waste, to cause to perish’; (n.) *\*hul-a* ‘ruin, destruction; end, death’.]

Hittite (3rd sg. pres.) *ḫa-at-zi*, *ḫa-at-ta-i*, *ḫa-at-ta-a-i*, *ḫa-ad-da-i*; *ḫa-az-zi-zi*, *ḫa-az-zi-az-zi* ‘to make a hole (in), to pierce, to prick, to stab, to slash, to perforate, to penetrate, to stick (as a means of killing), to hit (a target), to strike (especially a musical instrument), to engrave (a tablet)’, (1st sg. pres.) *ḫa-at-ta-ra-a-mi* ‘to prick, to incise, to engrave, to inscribe’, (nom.-acc. sg.) *ḫa-at-tal-la-an* ‘club, mace’, (nom.-acc. sg.) *ḫa-at-ta-ra-a[n]* ‘prick, awl’, (nom. sg.) *ḫa-at-tal-ki-iš-na-aš* ‘thorn-bush’ (< *\*ǵet’-ǵ-* [*\*Hed-H-*]); (3rd sg. pres.) *ḫa-at-ra-a-iz-zi* ‘to write, to send written word (about), to report, to order, to dispatch’, (nom.-acc. sg.) *ḫa-at-ri-eš-šar* ‘written message, decree’ (< *\*ǵet’-ro-* [*\*Hed-ro-*]); Cuneiform Luwian (3rd sg. pret.) *ḫa-at-ta-ri-it-ta* ‘to prick, to pierce’, (acc. sg.) *ḫa-at-ta-ra-an* ‘prick’; Hieroglyphic Luwian *ha-tu+ra/i-à-s* ‘letter’, (imptv.) *ha-tu+ra/i+à* ‘write!’; Lycian *χttadi* ‘to hurt, to damage’, *χdrñna* (?) ‘inscription’ (?) ~ Armenian *hatanem* ‘to cut’, *hat* ‘piece, cut, slice’; Avestan *aðu* ‘water-course, brook, canal’. Note: Though the comparison of Armenian *hatanem* with the Anatolian forms is semantically flawless, there are problems with the phonology, since double writing of the dental stop in Hittite points to original *\*-tʰ-* [*\*-t-*], while the Armenian form points to original *\*-t’-* [*\*-d-*]. However, double writing of medial stops in Hittite can also indicate the former presence of a laryngeal as in (nom. sg.) *me-ik-ki-iš* ‘large’, which is to be derived from earlier *\*mek’-* plus the suffix *\*-ǵi-* > *\*mek’ǵi-* > Hittite *me-ik-ki-iš*. Thus, comparison of Armenian *hatanem* with the Anatolian forms having medial double writing can be maintained if we derive the Anatolian forms from earlier *\*ǵet’-ǵ-*, which would yield Hittite *ḫatta-* as the regular outcome. Support for this interpretation may be found in Hittite *ḫatrai-*, which has consistent single writing. Thus, it is possible to envision a pre-Anatolian root *\*ǵet’-*, which was then extended by two separate suffixes in Proto-Anatolian proper: (A) *\*ǵet’-ǵo-*, yielding Hittite *ḫatta-* upon loss of the medial laryngeal, and (B) *\*ǵet’-ro-*, yielding Hittite *ḫatra-*. Stem (A) was further extended by a suffix *-ra-*, giving the attested agent noun *ḫattara-* ‘prick, awl’, which, in turn, served as the basis of the denominative verb *ḫattarai-*. Other derivatives of stem (A) are *ḫattatta-* ‘club, mace’ and *ḫattalkešna-* ‘thorn-bush’. The agent noun *\*ḫatra-*, from stem (B) and from which the denominative verb *ḫatrai-* is derived, is unattested in Hittite. [Cf. Bomhard 2021.3:913—915, no. 775, Proto-Nostratic root *\*xat’-* (~ *\*xət’-*): (vb.) *\*xat’-* ‘to cut into, to hollow out, to engrave, to prick, to pierce’; (n.) *\*xat’-a* ‘slice, carving, engraving, engraved line, incision’.]

Hittite (nom. sg.) *ḫu-u-ma-an-za* ‘all, whole’ (< \* $\text{\textcircled{2}}um$ -) ~ Latin *omnis* ‘all, every, whole’ (cf. Couvreur 1937:144—146; Kronasser 1956:41; Pedersen 1938:165). Note: Both Polomé (1965:18) and Puhvel (1984— .3:380) reject this etymology — Puhvel derives Latin *omnis* from \**opnis*. On the other hand, Walde—Hofmann (1965—1972.II:209—210) mention Oscan *úmbn*, which points to earlier \**omb-nis* and not \**opnis* as the source of both the Oscan form and Latin *omnis*. \**omb-nis* may contain an epenthetic *b*, in which case the original form would have been \**om-ni-s*. Here, *-ni-* is a suffix. Likewise, in Hittite *ḫu-u-ma-an-za*, the stem is \**ḫum-*, and the *-anz(a)* is a suffix. Thus, this comparison can be revived if we consider the original form to have been \* $\text{\textcircled{2}}um$ -, which later became \* $\text{\textcircled{2}}om$ -, with \**-o-* from earlier \**-u-* under the influence of the preceding laryngeal. Such an explanation overcomes the objections raised against this etymology based upon the irregular correspondence of Hittite *u* and Latin *o*. [Cf. Bomhard 2021.1:74.]

Hittite (1st sg. pres. act.) *na-aḫ-mi*, (3rd sg. pres. act.) *na-aḫ-ša-ri-ya-az-zi*, (1st sg. pret. act.) *na-aḫ-ḫu-un*, *na-a-ḫu-un* ‘to fear, to be or become afraid; to be respectful, to be careful’, (nom. sg.) *na-aḫ-ša-ra-az* ‘fear, fright; respect, reverence, awe; frightfulness’ (< \**neḫ₂-*); Cuneiform Luwian (nom. pl.) *na-aḫ-ḫu-wa-aš-ši-en<zi>* ‘fearful’ or ‘fearsome’ (?), (3rd sg. pret. act.) *na-aḫ-ḫu-u-wa-i* ‘to be afraid, worried’ (impersonal) ~ Old Irish *nár* (< \**nāsros*) ‘modest, bashful’. [Cf. Bomhard 2021.3:1114—1115, no. 922, Proto-Nostratic root \**naḥ-* (~ \**nəḥ-*): (vb.) \**naḥ-* ‘to tremble, to shake; to fear, to be afraid’; (n.) \**naḥ-a* ‘fear’.]

Hittite (3rd sg. pres. act.) *ḫu-iš-zi* ‘to live, to survive’ (< \* $\text{\textcircled{2}}w-es$ -); Hieroglyphic Luwian (nom.-acc. sg.) <sup>BESTIA</sup>*HWI-sà+ra/i-sa*, <sup>BESTIA</sup>*HWI-sa₅+ra/i* /*hwisar/* ‘game, wild beasts’ ~ Sanskrit *vāsati* ‘to dwell, to live, to inhabit; to dwell in, to abide in; to dwell or live near’; Greek (aor.) ἄεσα ‘to spend the night’; Middle Irish *fóaid* ‘to pass the night, to dwell’; Gothic *wisan* ‘to be, to remain’; Old Icelandic *vesa* ‘to be’; Old English *wesan* ‘to be, to happen’; Old High German *wesan* ‘to be’; Tocharian B *wäs-* ‘to dwell, to abide, to remain, to lie (on)’. Note: Curiously, Cuneiform Luwian has (nom.-acc. sg.) *ḫu-u-i-tar-ša* ‘wild animal’.

Hittite (nom.-acc. sg.) *me-e-ḫu-ur*, *me-e-ḫur*, *me-ḫur* ‘time’ (< \**meḫ₂-* < \**miḫ₂-*) ~ Sanskrit *māti-ḥ* ‘measure, accurate knowledge’, *māti*, *mīmāti* ‘to measure, to mete out, to mark off’; Latin *mētior* ‘to measure’; Gothic *mēl* ‘time’; Old Icelandic *mál* ‘measure; time, high time; meal’; Old English *mæþ* ‘measure, degree, proportion’, *mæl* ‘measure; (appointed) time, occasion; time for eating, meal’; Old Frisian *mēl* ‘time, mealtime’; Dutch *maal* ‘(n.) meal; (m.) time’; Old High German *māl* ‘time’ (New High German *Mal*). Note: In spite of consistent single writing of *ḫ* in Hittite, the laryngeal involved here is \* $\text{\textcircled{2}}₂$ , as reconstructed, for example, by Kloekhorst (2008:567—568). I consider this to be another example of the change of original \**i* to \**e* under the influence of \* $\text{\textcircled{2}}₂$ . Puhvel (1984— .6:108—112) sardonically notes:

The enormous, aporia-studded amount of attention expended on the etymology of *mehur* (see the account by Tischler, *Glossar L—M* 171—4; cf. Neu, *IBS* 52:184 [1987]) is a prime example of preconceptions and “theory” dragooning and hamstringing data. Derivation from IE \**mē-* has been around since Hrozný (*SH* 70) but has typically stumbled on the doctrines of “trilaryngealism” (*e*-vocalism incompatible

with Hittite *h*), so that Rieken (*Stammbildung* 340) could still claim in 1999 that “all attempts to connect *mēhur* with IE *\*mē-* founder thereon.”

Puhvel supports derivation from (traditional) *\*mē-* ‘to measure’, as do I. [Cf. Bomhard 2021.3:1072—1073, no. 895, Proto-Nostratic root *\*miḥ-* (~ *\*meḥ-*): (vb.) *\*miḥ-* ‘to measure, to mark off’; (n.) *\*miḥ-a* ‘measure, measurement’.]

Hittite (3rd sg. pres. act.) *ta-ru-uḥ-zi*, *tar-uḥ-zi*, *tar-ru-uḥ-zi*, *tar-ḥu-uz-zi*, etc. ‘to prevail, to conquer, to be powerful, to be able’, (nom.-acc. sg.) *tar-ḥu-u-i-li* ‘strong, powerful’, <sup>d</sup>*Tarḥunna-* name of the Storm God (< *\*t<sup>her</sup>ḥ<sub>2</sub>-w/u-* [*\*terH<sub>2</sub>-w/u-*]); Cuneiform Luwian <sup>d</sup>*Tarḥunt-* / <sup>d</sup>*Tarḥuwant-* name of the Storm God; Hieroglyphic Luwian *Tarhunt-*, *Tarhunza-* name of the Storm God; Lycian / Milyan *Trqqñt-* name of the Storm God; Lydian (?) *tarvtalli-* ‘of Tarvra’ (nom. sg. *tarvtallis*); Carian *trq(u)δ-* name of the Storm God ~ Sanskrit *túrvati* ‘to overpower, to overcome, to excel’. Note: Kloekhorst (2008:838) derives Lycian *Trqqñt-* first from Proto-Anatolian *\*trH<sup>w</sup>ent-* but later, on the same page, from (Proto-Indo-European) *\*trh<sub>2</sub>uent-*.

Hittite (nom. sg.) *ḥa-a-ra-aš*, (gen. sg.) *ḥa-ra-na-aš* ‘eagle’; Palaic *ḥa-ra-a-aš* ‘eagle’ (< *\*ḥ<sub>2</sub>or-/ḥ<sub>2</sub>r-*) ~ Greek ὄρνις ‘bird’; Armenian *oror* ‘kite, gull’; Welsh *eryr* ‘eagle’; Gothic *ara* ‘eagle’; Old Icelandic (poet.) *ari*, *örn* (< *\*arnu-*) (gen. sg. *arnar*, acc. *örnu*, pl. *ernir*) ‘eagle’; Old English *earn* ‘eagle’ (Middle English *ern(e)*, *earn*); Old High German *aro*, *arn* ‘eagle’ (New High German [poetic] *Aar*); Lithuanian *erėlis* (dial. *arėlis*) ‘eagle’; Latvian *ērglis* ‘eagle’; Old Prussian *arelie* ‘eagle’; Old Church Slavic *orъlbъ* ‘eagle’; Russian *orël* [orěɫ] ‘eagle’; Czech *orel* ‘eagle’; Polish *orzeł* ‘eagle’; Upper Sorbian *worjol* ‘eagle’; Lower Sorbian *jerjol*, *jerjel* ‘eagle’; Bulgarian *orél* ‘eagle’; Serbo-Croatian *órao* ‘eagle’. Notes: (1) Pokorny (1959: 325—326) reconstructs Proto-Indo-European *\*er-* on the basis of Lithuanian *erėlis*, but Cowgill (1965:146, fn. 2) questions the validity of this reconstruction since he takes Lithuanian *erėlis* to be assimilated from the dialectal form *arėlis*. Cowgill points out that the relative antiquity of the Lithuanian dialectal form is confirmed by Old Prussian *arelie*. Finally, he points out that Latvian *ērglis* has undergone even more remodeling. (2) This is another example of the change of *\*u* to *\*o* under the influence of *\*ḥ<sub>2</sub>*. [Bomhard 2021.3:877—878, no. 742, Proto-Nostratic (n.) *\*ḥur-a* (and/or *\*ḥer-a* ?) ‘hawk-like bird: falcon, hawk, eagle, kite’.]

3. *\*ḥ<sub>3</sub>* > (1) *ḥ-* (initially), *-ḥ-* (medially) in Hittite, Palaic, Cuneiform Luwian, and Hieroglyphic Luwian (written *h-*, *-h-*); > (2) *χ-* (initially), *-χ-/g-* (medially), *-q-* (< *\*/χ<sup>w</sup>/*) in Lycian:

As noted by Kimball (1987), the reconstruction of *\*ḥ<sub>3</sub>* is one of the most challenging problems in Indo-European comparative linguistics, due to the ambiguity of the available evidence (see also Melchert 1994a:71, §4.1.3.3). I agree with Melchert’s (1994a:72) statement: “I share the view of Normier (1980a: 58), Watkins (1982c: 457), Bernabé (1983: 39ff), Kimball (1983 & 1987a) and others that *\*/h<sub>3</sub>/* is preserved initially as *ḥ-* in Hittite, Palaic and Cuneiform Luwian.” Beyond that, scholars differ greatly in their opinions regarding which words are to be reconstruct with *\*ḥ<sub>3</sub>*. The one



thing that seems certain, though, is that  $*\mathfrak{z}_2$  and  $*\mathfrak{z}_3$  were phonetically distinct.  $*\mathfrak{z}_3$  is usually interpreted as the voiced counterpart of  $*\mathfrak{z}_2$ . I have only included a few examples below — those that seem certain to me based mostly upon my work on distant linguistic relationship.

Hittite (nom. pl. ?) *ha-a-u-e-eš* ‘sheep’ (<  $*\mathfrak{z}_3\text{owi-s}$ ); Hieroglyphic Luwian (nom. sg.) <sup>OVIS.ANIMAL</sup> *há-wá/i-i-sá* /hawis/ ‘sheep’; Cuneiform Luwian (nom. sg.) *ha-a-ú-i-iš* ‘sheep’; Lycian (acc. sg.) *χawā* ‘sheep’ ~ Sanskrit *ávi-h* ‘sheep’; Greek *ōīç, oīç* ‘sheep’; Latin *ovis* ‘sheep’; Armenian *hov-iw* ‘shepherd’; Old Irish *oí* ‘sheep’; Gothic *awēþi* ‘herd of sheep’; Old English *ēow, ēaw, ēw* ‘sheep’, *ēowu, ēowe* ‘ewe’, *ēowd, ēowde* ‘herd of sheep’; Old Frisian *ei* ‘ewe’; Old Saxon *ewwi* ‘ewe’; Dutch *ooi* ‘ewe’; Old High German *ouwi, ou* ‘ewe’, *ewit, owiti* ‘herd of sheep’; Lithuanian *avis* ‘sheep’; Latvian *avs* ‘sheep’; Old Church Slavonic *ovьca* (<  $*\text{owi-kā}$ ) ‘sheep’; Tocharian B *eye* ‘sheep’, *ā(u)w* ‘ewe’, *aiyye* ‘ovine, pertaining to sheep’. Notes: (1) Kimball (1999:142) reconstructs initial  $*h_2-$ , but this interpretation is rejected by Kortlandt (2001:2). Kloekhorst (2008:337—338) reconstructs  $*h_3\text{eu}i-$  with initial  $*\mathfrak{z}_3$  as do Beekes (2010.II:1060—1061) and Derksen (2008:384 and 2015:74). (2) In my opinion, the  $*-o-$  is original here, that is to say, it is inherited from Proto-Nostratic. (3) Lycian (acc. sg.) *χavā* ‘sheep’ shows that initial  $*\mathfrak{z}_3$  becomes  $\chi$  in Lycian. However, according to Kimball (1987) and Melchert (1994a:72), initial  $*\mathfrak{z}_3$  is lost in Lycian. [Cf. Bomhard 2021.3:903—904, no. 768, Proto-Nostratic (n.)  $*\zeta uw-a$  (~  $*\zeta ow-a$ ) ‘herd of small animals, sheep and goats’.]

Hittite (nom.-acc. sg.) *ha-aš-ta-a-i, ha-aš-ta-i, ha-aš-da-i, [h]a-aš-da-a-i* ‘bone(s)’ (<  $*\mathfrak{z}_3\text{ost}^h-$  [ $*H_3\text{ost}-$ ]); Cuneiform Luwian (nom.-acc. sg.) *ha-a-aš-ša, ha-aš-ša* ‘bone’ ~ Sanskrit *ásthi*, (gen. sg.) *asthnáḥ* ‘bone’; Greek *ὀστέον* ‘bone’; Latin *os* ‘bone’; Albanian *asht, ashti* ‘bone’. Notes: (1) The following is also found in Hittite: (nom.-acc. sg.) *É hé-eš-ta-a, (gen. sg.) É hi-iš-ta-a-aš, É hi-iš-ta-aš, É hé-eš-ta-a-aš, É hé-eš-ta-aš* ‘mausoleum ?’. Most scholars connect this form with *ha-aš-ta-a-i* ‘bone(s)’ as ‘bone-house’ > ‘sepulcher, mausoleum’, but Kloekhorst (2008:346—347) prefers to see it as a borrowing (“foreignism”). Kloekhorst does not identify the source of the borrowing, but, given the fact that the paradigm “hardly shows any inflected forms” and given the specialized cultic/ritualistic meaning, I am inclined to accept Kloekhorst’s views. (2) The Sanskrit form requires a laryngeal suffix to account for the aspiration: *ásthi* <  $*\mathfrak{z}_3\text{ost}^h-\mathfrak{z}_2-$  [ $*H_3\text{ost-H-}$ ].

Hittite (3rd sg. pres. act.) *har-ap-zi* ‘to separate oneself and (re)associate oneself elsewhere’ (<  $*\mathfrak{z}_3\text{or-b}^h-$ ) ~ Sanskrit *ár̥bha-h* ‘little, small; child’; Armenian *orb* ‘orphan’; Greek *ὀρφανός* ‘orphan, without parents, fatherless; (metaph.) abandoned, bereft’; Latin *orbus* ‘bereft, deprived by death of a relative or other dear one; bereaved (of); childless; an orphan’; Old Irish *orb* ‘heir’, *orb(b)e, orpe* ‘inheritance’; Gothic *arbi* ‘inheritance’, *arbja* ‘heir’ (f. *arbjō* ‘heiress’); Old Icelandic *arfi* ‘heir, heiress’, *arfr* ‘inheritance, patrimony’, *erfa* ‘to inherit’, *erfð* ‘inheritance’; Old Swedish *arve, arver* ‘heir’; Danish *arv* ‘heir’; Norwegian *arv* ‘heir’; Old English *ierfa, irfa* ‘heir’, *ierfe* ‘inheritance, bequest, property’, *erfe, irfe, yrfe* ‘inheritance, (inherited) property’, *irfan, yrfan* ‘to inherit’; Old Frisian *erva* ‘heir’, *erve* ‘inheritance, inherited land, landed property’; Old Saxon *erbi*

‘inheritance’; Middle Dutch *erve* ‘heir’; Old High German *arbi*, *erbi* ‘inheritance’, *arbeo*, *erbo* ‘heir’ (New High German *Erbe* ‘inheritance; heir’); Old Church Slavonic *rabъ* ‘servant, slave’; Russian *rab* [paḄ] ‘slave, serf, bondsman’ (f. *rabá* [paḄa] ‘slave, serf, bondmaid’). [Cf. Bomhard 2021.3:923—925, no. 784, Proto-Nostratic root \**γor-*: (vb.) \**γor-* ‘to leave, to go away, to depart, to separate, to abandon’; (n.) \**γor-a* ‘leaving, departure; separation; abandonment’; extended form: (vb.) \**γor-V-b-* ‘to leave, to go away, to depart, to separate, to abandon’; (n.) \**γor-b-a* ‘leaving, departure; separation; abandonment’.]

Hittite (nom.-acc. sg.) *še-e-ḫur*, *še-e-ḫu-ur*, *še-e-ḫu-wa-ar* ‘urine’, (3rd sg. pret. act.) *še-e-ḫu-ri-ya-[a]t* ‘to urinate’, (nom. sg.) *še-e-ḫu-ga-ni-ya-u-wa-an-za* ‘besmeared with urine’ (< \**seḡ<sub>3</sub>-ur* < \**siḡ<sub>3</sub>-ur*). Notes: (1) There are no known cognates, either in the other Anatolian languages or in the non-Anatolian Indo-European daughter languages. (2) Later in this paper, I am going to explain why I believe that it is extremely probable that \**ḡ<sub>2</sub>* and \**ḡ<sub>3</sub>* had exactly the same vowel-coloring effects, in this case, \**i* > \**e* under the influence of \**ḡ<sub>3</sub>*. (3) Given the ambiguities involved, derivation of Hittite (nom.-acc. sg.) *še-e-ḫur*, *še-e-ḫu-ur*, *še-e-ḫu-wa-ar* ‘urine’ from \**seḡ<sub>2</sub>-ur* (< \**siḡ<sub>2</sub>-ur*), with \**ḡ<sub>2</sub>* instead of \**ḡ<sub>3</sub>*, is also a possibility. (4) As observed by Kloekhorst (2008:741—742): “The noun shows the same inflection as *mēḫur* / *mēḫun-* ‘time’.” (5) Kloekhorst’s conjecture that Hittite *še-e-ḫur* may be a loan from Palaic cannot be proven inasmuch as the word does not occur in the extant Palaic corpus. (6) Sturtevant (1951:50, §75) also reconstructed \**ḡ<sub>3</sub>* here (Indo-Hittite \**seḡ<sub>3</sub>ur*), but for different reasons.

#### 4. \**ḡ<sub>4</sub>* > Ø in Anatolian:

Hittite (nom. sg.) *al-pa-aš*, *al-pa-a-aš* ‘(storm) cloud’ (< \**ḡ<sub>4</sub>el-b<sup>h</sup>o-s*) ~ (?) Greek ἄλφος ‘whiteness, white leprosy’; Latin *albus* ‘white’; Umbrian *alfu* ‘white’; Old Icelandic *elptr* ‘swan’ (named for its white color); Old English *iefetu* ‘swan’; Old High German *albiz* ‘swan’; Old Church Slavonic *lebedъ* ‘swan’ (< Proto-Slavic \**olbōdъ*; \**oldōtъ*; \**elbedъ*; \**elbōtъ* ‘swan’ [cf. Derksen 2008:365—366]); Polish *labędź* ‘swan’; Czech *labud* ‘swan’; Russian *lébed’* [лебедь] ‘swan’. Note: This etymology is rejected by Kloekhorst (2008:169), mainly on semantic grounds. However, he also points out that he has “no better IE etymology for this word.” See also Puhvel (1984—.1/2:37—38), who also questions this etymology on semantic grounds. However, the proposed alternative etymologies mentioned by Puhvel fare even worse (cf. Woodhouse 2012:226—227). [Cf. Bomhard 2021.3:814—815, no. 690, Proto-Nostratic root \**hal-* (~ \**həl-*): (vb.) \**hal-* ‘to light up, to beam forth, to shine, to brighten up, to radiate’; (n.) \**hal-a* ‘clearness, brightness, radiance, purity’; (adj.) ‘clear, pure, bright, shining, radiant’.]

Hittite (adv.; postpos.) *a-ap-pa* ‘behind, afterwards; back, again, further’, *a-ap-pa-an* (adv.) ‘behind, after(wards)’ (< \**ḡ<sub>4</sub>ep<sup>h</sup>o* [\**H<sub>4</sub>epo*]); Cuneiform Luwian *a-ap-pa* ‘back, again, after’; Hieroglyphic Luwian *á-pa-na* ‘after, behind, again’; Lycian (adv.) *epñ* ‘afterwards’, *epñte* (adv.) ‘thereafter’, *epre/i-* (adj.) ‘back-, rear-’ ~ Sanskrit *ápa* ‘away, forth, back’; Old Persian (prefix) *apa-* ‘away’; Greek ἄπο, ἀπό ‘off, away, back’; Latin *ab* ‘away from’; Gothic *af* ‘of, from, by, away from’; Old

- Icelandic *af* ‘off, from’; Old English *of* ‘from, away from’; Old Frisian *af, of* ‘off, from, away from’; Old Saxon *af* ‘off, from, away from’; Dutch *af* ‘off, down’; Old High German *ab, aba* ‘off, from, away from’ (New High German *ab*). [Cf. Bomhard 2021.3:822—823, no. 696, Proto-Nostratic root *\*hap<sup>h</sup>-* (~ *\*həp<sup>h</sup>-*): (vb.) *\*hap<sup>h</sup>-* ‘to turn, to turn away, to turn back’; (n.) *\*hap<sup>h</sup>-a* ‘the act of turning away, turning back, overturning’; (adj.) ‘turned away from, turned back, overturned’.]
- Hittite (nom.-acc. sg.) *a-ra-a-u-(wa-)aš* ‘free’, (1st sg. pres.) *a-ra-wa-aḫ-ḫi* ‘to set free, to make free’ (< *\*h<sub>4</sub>er-wo-/h<sub>4</sub>or-wo-*); Lycian *arawa* ‘free’, *arawā* ‘exempt from tax’, Ἐρεῶας */erewa-/* ‘free(city)’ ~ Lithuanian *árvas* ‘free’. Notes: (1) Puhvel’s (1984— .1/2:119—121) rejection notwithstanding, the most convincing Indo-European cognate remains Lithuanian *árvas* ‘free’. See also Tischler 1977— :53—55. (2) This etymology is accepted by Gamkrelidze—Ivanov (1995.I:397—398 and I:781), who reconstruct *\*arw-* (I:397) and *\*arwo-* ‘free agriculturalist’ (I:781). However, the putative Latin, Middle Irish, Greek, and Armenian cognates adduced by Gamkrelidze—Ivanov do not belong here. [Cf. Bomhard 2021.3:826—827, no. 701, Proto-Nostratic root *\*her-* and/or *\*hor-*: (vb.) *\*her-* and/or *\*hor-* ‘to escape, to flee, to run away’; (n.) *\*her-a* and/or *\*hor-a* ‘escape, flight’; (adj.) ‘escaped, liberated, free’.]
- Hittite (nom. sg.) *ta-ya-aṣ-zi-il* ‘theft’, (3rd sg. pres. act.) *ta-a-i-eṣ-zi, ta-i-eṣ-zi*, etc. ‘to steal (from)’ (< *\*t<sup>h</sup>eṣ<sub>4</sub>-ye/o-* [*\*(s)teH<sub>2</sub>-ye/o-*]) ~ Sanskrit *tāyú-ḥ* ‘theft’, *stená-ḥ* ‘thief, robber’, *stāyát* ‘in secret’; Avestan *tāyuš* ‘thief’; Greek τητάω ‘to rob’; Old Irish *táid* ‘thief’; Old Church Slavic *tatb* ‘thief’. Note: The Sanskrit forms show so-called “movable *s*” or “mobile *s*”.
- Hittite (acc. sg.) *ma-ak-la-an-ta-an* ‘thin, meager, slim (of animals)’ (< *\*meṣ<sub>4</sub>k<sup>h</sup>-lo-nt<sup>h</sup>-* [*\*meH<sub>2</sub>k<sup>h</sup>-lo-nt-*]) ~ Greek μήκος (Doric μάκος) ‘length’, μακρός ‘long, tall’; Latin *macer* ‘thin’; Old Icelandic *magr* ‘lean’; Old English *mæger* ‘lean, meager’; Old High German *magar* ‘thin, meager’ (New High German *mager*).
- Hittite (1st sg. pres. act.) *ti-ya-mi* ‘to step, to go stand, to place oneself, to set in’ (< *\*(s)t<sup>h</sup>(e)ṣ<sub>4</sub>-ye/o-* [*\*(s)t(e)H<sub>2</sub>-ye/o-*]; Cuneiform Luwian (3rd sg. pres. act.) *ta-a-i* ‘to come to stand’; Hieroglyphic Luwian (3rd sg. pres. act.) *ta-i* ‘to come to stand’ ~ Sanskrit (reduplicated) *tīṣṭhati* ‘to stand’; Greek (reduplicated) ἵστημι ‘to make to stand; to stand’, στατός ‘placed, standing’; Latin (reduplicated) *sistō* ‘to cause to stand, to set, to place’; Gothic *standan* ‘to stand’; Old Icelandic *standa* ‘to stand’; Old English *standan* ‘to stand’; Old Frisian *stonda, stān* ‘to stand’; Old Saxon *standan, stān, stēn* ‘to stand’; Old High German *stantan, stān, stēn* ‘to stand’ (New High German *stehen*); Lithuanian *stóti* ‘to stand’; Old Church Slavic *stati* ‘to stand, to become’. Notes: (1) The Proto-Indo-European root contains so-called “movable *s*” or “mobile *s*”. (2) As noted by Kloekhorst (2008:879—880):

From the beginning of Hittite studies it has been in debate whether *tije/a-<sup>zi</sup>* goes back to the PIE root *\*d<sup>h</sup>eh<sub>1</sub>-* ‘to put’ or *\*steh<sub>2</sub>-* ‘to stand’. The former root would be possible in view of the meaning ‘to place oneself’ and the NH merger of *tije/a-<sup>zi</sup>* with *dai-<sup>i</sup> / ti-*, which clearly must reflect *\*d<sup>h</sup>eh<sub>1</sub>-*. An etymological connection with *\*steh<sub>2</sub>-* would much better fit the meaning ‘to step, to go stand’, however, which cannot easily be derived from an original meaning ‘to put, to place’.

Kloekhorst reconstructs Proto-Indo-European *\*(s)th₂-je/o-*.

### Labialized Laryngeals

Adrados, Kloekhorst, Martinet, and Puhvel, among others, have proposed that one or more labialized laryngeals should be reconstructed for Proto-Indo-European, and, indeed, there is some evidence to support such a view. The following are taken from Bomhard (2021.3:916—920, nos. 777—781):

Proto-Indo-European *\*ǵ₂ʷel-/ǵ₂ʷol-/ǵ₂ʷl-* ‘to draw, to pull, to tear out’: Avestan (in compounds) *varək-* ‘to draw’; Latin *vellō* ‘to pluck, to pull, to tear out’; Lithuanian *velkù, vilkti* ‘to drag, to pull’; Old Church Slavic *vlěkq, vlěšti* ‘to draw, to drag’; Gothic *wilwan* ‘to rob, to plunder’, *wilwa* ‘robber’. Note: There may be a connection here with the words for ‘wool’ in the sense ‘to pluck (wool)’, in which case, we can add the following: Hittite (dat.-loc. sg.) *ḫu-u-la[n(i)]* ‘wool’ (< *\*ǵ₂ʷ(e)lǵ₁-n-*); Cuneiform Luwian *\*ḫulana/i-* ‘wool’ ~ Sanskrit *ūrṇa-h* ‘wool’; Greek *λῆνος* ‘wool’; Latin *lāna* ‘wool’; Welsh *gwlan* ‘wool’; Gothic *wulla* ‘wool’; Old Icelandic *ull* ‘wool’; Old English *wull* ‘wool’; Old High German *wolla* ‘wool’ (New High German *Wolle*); Russian *vólna* [волна] ‘fleece, wool’; Lithuanian *vilna* ‘wool’. For the semantics, cf. Buck 1949:400, no. 6.22 wool: “... prob. the same as Lat. *vellere*, etc. ‘tear, pluck’.” [Cf. Bomhard 2021.3:916—917, no 777, Proto-Nostratic root *\*xʷal-/xʷəl-*: (vb.) *\*xʷal-* ‘to pull (off, out), to tear (off, out)’; (n.) *\*xʷal-a* ‘the act of pulling or tearing (off, out)’.]

Proto-Indo-European *\*ǵ₂ʷet-* [*\*H₂ʷed-*] ‘to say, to speak’: Sanskrit *vāda-h* ‘speech, discourse, talk, utterance, statement’, *vádati* ‘to speak, to say, to utter, to tell, to report, to speak to, to talk with, to address’; Greek (?) *αείδω* (< *\*ǵ₂+είδω* < *\*awe-ud-*) ‘to sing’, *αὐδάω* ‘to utter sounds, to speak’, *αὐδή* (Doric *αὐδά*) ‘the human voice, speech’, (?) *ἀηδών, ἀηδών* ‘nightingale’; Lithuanian *vadinù, vadinti* ‘to call, to name’. Note: There are no known Anatolian cognates. [Cf. Bomhard 2021.3: 918—919, no. 779, Proto-Nostratic root *\*xʷat-* (~ *\*xʷət-*): (vb.) *\*xʷat-* ‘to chatter, to speak’; (n.) *\*xʷat-a* ‘chatter, talk’.]

Proto-Indo-European *\*ǵ₂ʷer-k-* [*\*H₂ʷer-k-*] ‘to cry, to squeal’: Old Church Slavic *vrěštq, vrěštati* ‘to cry, to squeal’; Czech *vřískat, vřeštět* ‘to cry, to whimper’; Lithuanian *verkiù, verkti* ‘to weep, to cry’, *verkšnà* ‘cry-baby’, *verksmas* ‘weeping, crying’. Note: There are no known Anatolian cognates. [Cf. Bomhard 2021.3: 919—920, no. 781, Proto-Nostratic root *\*xʷir-* (~ *\*xʷer-*): (vb.) *\*xʷir-* ‘to make a loud noise, to make a shrill sound’; (n.) *\*xʷir-a* ‘loud noise’.]

### The Phonetic Values of the Laryngeals

The literature listed at the end of this paper really needs to be consulted to get an idea of how much opinions differ regarding the phonetic values of the various laryngeals. Not only that, but also on how widely different interpretations of the same data lead to positing

different laryngeals at the Proto-Indo-European level. I am hoping that my own endeavors lead to clarification and not more confusion.

To begin, it might be helpful to repeat what I had previously written on the question of the phonetic values assigned to the laryngeals (cf. Bomhard 2021.1:70—75):<sup>26</sup>

One of the most difficult riddles to solve has been and continues to be the determination of the probable phonetic values of the various laryngeals (cf. Kessler no date). Some attempts include the following:

1. Sturtevant (1942:19), following Sapir (1938), assigns the following phonetic values to the laryngeals:  $*\varrho_1$  ( $*H_1$ ) = a glottal stop with frontal timbre (Sturtevant writes  $*ʔ$ );  $*\varrho_4$  ( $*H_4$ ) = a glottal stop with velar timbre (Sturtevant writes  $*ʔ$  [in later works, Sturtevant writes  $*h$ ]);  $*\varrho_2$  ( $*H_2$ ) = a voiceless velar spirant (Sturtevant writes  $*x$ );  $*\varrho_3$  ( $*H_3$ ) = a voiced velar spirant (Sturtevant writes  $*\gamma$ ).
2. According to Lehmann (1952:103—108),  $*\varrho_1$  ( $*H_1$ ) was either a weakly aspirated glottal fricative (Lehmann writes  $*ʔ$ ) or a pharyngeal fricative;  $*\varrho_4$  ( $*H_4$ ) was apparently a glottal aspirated fricative (Lehmann writes  $*h$ );  $*\varrho_2$  ( $*H_2$ ) was a voiceless velar fricative (Lehmann writes  $*x$ ); and  $*\varrho_3$  ( $*H_3$ ) was a rounded voiced velar fricative  $*[\gamma^w]$  (Lehmann writes  $*\gamma$ ).
3. Keiler (1970:68) posits the following values:  $*\varrho_1$  ( $*H_1$ ) = a voiceless glottal fricative  $*h/$ ;  $*\varrho_2$  ( $*H_2$ ) = a voiceless pharyngeal fricative  $*ħ/$ ; and  $*\varrho_3$  ( $*H_3$ ) = a voiced pharyngeal fricative  $*ʕ/$ . Couvreur (1937) arrived at the same conclusion.
4. Finally, Colarusso (1981:550) assigns the following values:  $*\varrho_1$  ( $*H_1$ ) = either a glottal stop  $*ʔ/$  or voiceless and voiced pharyngealized velar fricatives,<sup>27</sup>  $*x^s/$  and  $*\gamma^s/$  (Colarusso writes  $*\bar{x}/$  and  $*\bar{\gamma}/$ ), respectively;  $*\varrho_2$  ( $*H_2$ ) = voiceless and voiced pharyngeal fricatives,  $*h/$  (Colarusso writes  $*ħ/$ ) and  $*ʕ/$ , respectively;  $*\varrho_3$  ( $*H_3$ ) = either labialized voiceless and voiced pharyngeal fricatives,  $*ħ^w/$  (Colarusso writes  $*ħ^w/$ ) and  $*ʕ^w/$ , respectively, or a labialized glottal stop  $*ʔ^w/$ ; and  $*\varrho_4$  ( $*H_4$ ) = a voiceless glottal fricative  $*h/$ .

According to Colarusso (1981:512), Couvreur (1937:264), Fortson (2010:64), Messing (1947:223—225), Sturtevant (1942:19 and 1951:54), Kloekhorst (2008a:62), and Pooth (2015:11),  $*\varrho_1$  ( $*H_1$ ) was a glottal stop  $*ʔ/$ . The interpretation of  $*\varrho_1$  ( $*H_1$ ) as a glottal stop explains why this laryngeal did not color contiguous vowels. As noted by Catford (1977:105): “simple glottal stop has no influence on the quality of contiguous vowels”. This is verifiable from both Northwest Caucasian and Arabic, where glottal stops have no effect on vowel quality (cf. Colarusso 1981:511 for Northwest Caucasian and Al-Ani 1970:60—62 for Arabic). Moreover, loss of a glottal stop between an immediately preceding short vowel and an immediately following non-syllabic causes compensatory

<sup>26</sup> This is modified (enhanced, reformatted, and updated) from the original.

<sup>27</sup> Colarusso calls them “pharyngealized uvulars” and compares them to similar sounds in Semitic, where he states that they are “actually pharyngealized velars underlyingly”, and he writes them in the chart on page 550 as pharyngealized velars ( $*\bar{x}/$  and  $*\bar{\gamma}/$ ). Consequently, I have labeled them “voiceless and voiced pharyngealized velar fricatives”.

lengthening of the vowel in Akkadian and Arabic (cf. Cantineau 1960:79; Couvreur 1937:288—289; Moscati [ed.] 1964:61—64; J. Watson 2002:18—19). Note the following examples from Akkadian (these examples are taken from Couvreur 1937:288—289):

1. Akkadian *\*raʔšu* > *rāšu* (later *rēšu*) ‘head’; Hebrew *rōʔš* [רֹאשׁ] ‘head’; Aramaic *rēšā* ‘head’; Phoenician *rʔš* ‘head’; Arabic *raʔs* ‘head’; Epigraphic South Arabian *rʔs* ‘head’; Šheri / Jibbāli *rēš/réš* ‘head’; Soqotri *riy* ‘head’; Ugaritic *rīs* ‘head’; Geez / Ethiopic *rəʔəs* ‘head’ [ርእሰ]; Tigrinya *rəʔsi* ‘head’; Tigre *räʔas* ‘head’; Amharic *ras* ‘head’. Cf. Militarëv 2011:75, no. 38.
2. Akkadian *\*raḥmu* > *\*reḥmu* > *\*reʔmu* > *rēmu* ‘grace, mercy’; Hebrew *raḥūm* [רחום] ‘compassionate’; Arabic *raḥima* ‘to have mercy, compassion’, *raḥma* ‘pity, compassion’; Šheri / Jibbāli *raḥām* ‘to be kind’; Mehri *rəḥām* ‘to be kind to someone’; Ḥarsūsi *reḥam* ‘to pity’; Ugaritic *rḥm* ‘to be kind’; Tigre *räḥama* ‘to have pity on’ (Arabic loan).
3. Akkadian *\*baʕlu* > *\*beʕlu* > *\*beʔlu* > *bēlu* ‘owner, lord’; Hebrew *baʕal* [בעל] ‘lord, owner’; Ugaritic *bʕl* ‘owner of the house’; Arabic *baʕl* ‘husband, master, owner’; Epigraphic South Arabian *bʕl* ‘master, owner’; Ḥarsūsi *bāl* ‘master, lord’; Mehri *bāl* ‘owner, possessor’; Šheri / Jibbāli *báʕal* ‘person owning’; Soqotri *baʕl* ‘master, lord’; Geez / Ethiopic *baʕāl* [በኃል] ‘owner, master’; Tigre *bäʕal* ‘master’; Tigrinya *bäʕal*, *baʕal* ‘master’; Amharic *bal* ‘master’.

Identical developments are assumed for *\*ǵ₁* (*\*H₁*) in Proto-Indo-European. This laryngeal is not directly attested in any of the Indo-European daughter languages, including Hittite and the other Anatolian daughter languages (cf. Bomhard 1976:230; Sturtevant 1942:53 and 1951:154).

Additional confirmation that *\*ǵ₁* (*\*H₁*) was a glottal stop is provided by the following forms (discussed above): Sanskrit (3rd sg.) *píbatī* ‘drinks’, Latin *bibit* ‘drinks’, Old Irish *ibid* ‘drinks’. The Proto-Indo-European antecedent would have been the reduplicated verbal form (3rd sg. pres.) *\*pʰi-pʰǵ₁-etʰi* [*\*pi-pH₁-eti*] ‘drinks’, that is, *\*pʰi-pʰǵ-etʰi*. Now, according to Gamkrelidze, Hopper, and Ivanov, glottalized stops become voiced stops in Sanskrit, Latin, and Old Irish. Likewise, we would expect the cluster *\*-pʰǵ-* to become /b/ in these languages, and this is exactly what we do in fact find. The following developments may be assumed (cf. Gamkrelidze—Ivanov 1995.I:856): *\*pʰi-pʰǵ-etʰi* > (with deaspiration of *\*-pʰ-* in the cluster *\*-pʰǵ-*) *\*pʰi-pʰǵ-etʰi* > (with reanalysis of *\*-pʰ-* as *\*-pʰ-*) *\*pʰi-pʰ-etʰi* > (with deglottalization) *\*pʰi-p-etʰi* > (with voicing of medial *\*p*) *\*pʰi-b-etʰi* > (with deaspiration of voiceless aspirates) *\*pi-b-eti* > Sanskrit *píbatī* ‘drinks’, Latin *bibit* ‘drinks’, Old Irish *ibid* ‘drinks’.

Kuryłowicz (1935:29—30) sets up *\*ǵ₄* (*\*H₄*) to account for those cases in which an *a* in the non-Anatolian daughter languages corresponds to an *a* in Hittite, and Hittite lacks a contiguous laryngeal reflex. That is to say that *\*ǵ₄* (*\*H₄*) is not directly attested in Hittite or in any of the other daughter languages (cf. Bomhard 1976:230; Sturtevant 1942:42 and 1951:51—52), though its former presence can be determined by the fact that it changed a contiguous *\*e* to *\*a* and by the fact that it caused compensatory vowel lengthening when lost between an immediately preceding short vowel and an immediately following non-syllabic. According to Hopper (1977a:49—50), typological evidence implies that the

voiceless laryngeal fricative /h/ should be added to the Proto-Indo-European phonemic inventory, and this coincides with the phonetic value assigned to  $*\varrho_4$  ( $*H_4$ ) by Colarusso (1981:512), Lehmann (1952:108), and (apparently) Sturtevant (1951:52). In terms of distinctive feature theory, /h/ is [+cons, +low, -voice, +cont, +grave]. As far as we are concerned, the most important feature is [low]. According to Chomsky—Halle (1968:305), the articulatory gesture behind the feature [low] is a “lowering [of] the body of the tongue below the level it occupies in the neutral position”, while Colarusso (1981:509) defines it as “an opening of the oral cavity to enhance resonance”. It was the presence of this feature that was responsible for the lowering of a contiguous  $*e$  to  $*a$ . Finally, we may note that developments similar to those assumed for  $*\varrho_4$  ( $*H_4$ ) in Proto-Indo-European are found in Ubykh and in the Circassian languages, where /h/ (and /h<sup>w</sup>/) lowers and colors contiguous vowels and also causes compensatory vowel lengthening when lost (cf. Colarusso 1975:396).

Reflexes of  $*\varrho_2$  ( $*H_2$ ) are found in Hittite and the other older Anatolian languages (that is, Palaic and Cuneiform and Hieroglyphic Luwian), where they are written (*h*)*h* (cf. Fortson 2010:178; Sturtevant 1942:35 and 1951:47). This laryngeal also survives in Lycian, where it is written  $\chi$ . Like  $*\varrho_4$  ( $*H_4$ ),  $*\varrho_2$  ( $*H_2$ ) lowers a contiguous  $*e$  to  $*a$ . On this basis, we would expect  $*\varrho_2$  ( $*H_2$ ) also to be characterized by the presence of the feature [low]. A good candidate to assign as the phonetic values of  $*\varrho_2$  ( $*H_2$ ) would be the voiceless multiply-articulated pharyngeal/laryngeal /*h̥h*/ (it could also have been an adytal [+CP, +low]). Not only is this sound marked by the presence of the feature [low], which accounts for the lowering of adjacent vowels, but it also makes it easy to account for the fact that  $*\varrho_2$  ( $*H_2$ ) appears as *h* in Armenian before full-grade vowels. We can envision a change of  $*\bar{h}h$  into  $*h$  similar to what is found in the Ashkharwa dialect of Abkhaz (cf. Colarusso 1981:516). The resulting  $*h$  would have subsequently been lost in all of the non-Anatolian daughter languages except Pre-Armenian. As in Ashkharwa, we may venture a guess that  $*\bar{h}h$  developed from the earlier pharyngeal  $*\bar{h}$  in Pre-Anatolian Proto-Indo-European. Indeed, support for such an assumption comes from the lexical parallels between Proto-Indo-European and Proto-Afrasian, where Proto-Indo-European  $**\varrho_2$  ( $*H_2$ ) corresponds to Proto-Afrasian  $*\bar{h}$ . Finally, we should take note of Jakobson’s (1971[1956]:518—520) description of similar sounds in Arabic (see also J. Watson 2002:44—45):

... /h/ is essentially a pharyngealized laryngeal. Of the two phonemes of this type, /h̥/ is usually produced without voice and /h̥/ with voice. Since a considerable part of the air used with /h̥/ is consumed by voicing alone, this phoneme is a lenis, in contradistinction to the fortis /h/. Thanks to the pharyngeal contraction, the voice-pitch in /h̥/ and the whisper-pitch in /h̥/ are very low: “In passing to /h̥/ from a preceding vowel the voice has to descend rapidly, often through more than an octave, and is cut off at its lowest pitch. If a vowel *follows*, the pitch begins at its lowest level and rises quickly, through a similar interval, to normal vowel pitch.” (1971[1956]:518—519)

As to the influence upon the adjacent vowels, the componential analysis of a phoneme cannot proceed from the contextual variants of neighboring phonemes: often the variation is due not to a single feature but to a combination of concurrent features. Furthermore, in many instances the pharyngeals modify adjacent vowels in the same direction as pharyngealized buccals. In colloquial Egyptian both the pharyngealized buccals and the pharyngeals appear to exert a modifying retracting influence on preceding and following a-vowels (Gairdner, p. 46f.). In the

dialect of El-Hamma, Cantineau observes that the /a:/ is pronounced “entre *a* et *o* ouvert” in contact with pharyngealized dentals, while in contact with pharyngeals it is realized as “*a* moyen français”, in contact with velars it oscillates between the two positions mentioned, and in other contexts it is a front vowel. In the same dialect the phoneme /u:/ is shifted towards the closed *o* in the neighborhood of pharyngealized dentals, velars, and pharyngeals (1951, p. 78f.). (1971[1956]:520)

It is more difficult to determine the phonetic value of  $*\varrho_3$  ( $*H_3$ ) than of any of the other laryngeals. Reflexes of  $*\varrho_3$  ( $*H_3$ ) are also found in the older Anatolian languages (cf. Bomhard 1976:228—230; Fortson 2010:178; Sturtevant 1942:44 and 1951:49—51). Kuryłowicz (1935:28—30) tried to show that  $*\varrho_3$  ( $*H_3$ ) changed a contiguous  $*e$  to  $*o$ , but Sturtevant (1938:104—111 and 1942:20) has argued against such an assumption. The majority of scholars are inclined to accept Kuryłowicz’s interpretation. Now, several scholars (Sturtevant, Lehmann, Keiler, and others) have suggested that  $*\varrho_3$  ( $*H_3$ ) was the voiced counterpart of  $*\varrho_2$  ( $*H_2$ ). Consequently, we can speculate that  $*\varrho_3$  ( $*H_3$ ) was a voiced multiply-articulated pharyngeal/laryngeal  $*/\text{ʕf}/$  (as with  $*/\text{ħh}/$ , it could also have been an adytal [+CP, +low]). Now, a more careful examination indicates that  $*\varrho_3$  and  $*\varrho_2$  may actually have had the same vowel-coloring effects. We know from the examples given above that  $*\varrho_2$  lowered and colored a contiguous  $*e$  to  $*a$ , original  $*i$  to  $e$ , and original  $*u$  to  $*o$ . As in the Arabic case discussed by Jakobson above, we would expect  $*\varrho_3$  to have had a similar effect on these vowels early Proto-Indo-European. That is to say that we would expect  $*\varrho_3$  to have lowered and colored a contiguous  $*e$  to  $*a$ , original  $*i$  to  $e$ , and original  $*u$  to  $*o$ . In fact, there is some evidence — albeit controversial — within Indo-European itself to support this, as the following examples involving  $*\varrho_2$  illustrate (these are also listed above, together with additional examples):

1. Early Proto-Indo-European  $*\varrho_2\text{ink}^h$  > later Proto-Indo-European  $*\varrho_2\text{enk}^h$  ‘to reach, to come to, to arrive at’ (Pokorny 1959:316—318 reconstructs  $*\text{enek}^-$ ,  $*\text{nek}^-$ ,  $*\text{enk}^-$ ,  $*\text{nk}^-$  here): Hittite (3rd sg.) *hi-in-ik-zi* ‘to present, to deliver, to offer, to allot’; Sanskrit *aśnóti* ‘to reach, to come to, to arrive at, to get, to obtain; to master; to offer’; Latin *nancior* ‘to get, to gain, to obtain’, *nanciscor* ‘to get, to gain, to receive, to meet’; Tocharian A *ents-*, B *eñk-* ‘to seize, to take’. Cf. Puhvel 1984—.3:289—292; Melchert 1994a:143—144. The Hittite form directly attests  $*\varrho_2\text{ink}^h$ . Note: That the transition from  $*i$  to  $*e$  was already taking place as early as Hittite is shown by forms such as (nom.-acc. sg.) *hé-en-gur* ‘consignment, offering, oblation, gift, tribute’ beside (nom.-acc. sg.) *hi-in-ku-wa-ar*. The same variation occurs in (nom.-acc. sg.) *hé-en-kan* ‘death, doom, deadly, disease, plague’ alongside (nom.-acc. sg.) *hi-in-kán*.
2. Early Proto-Indo-European  $*\varrho_2\text{ul-}$  > later Proto-Indo-European  $*\varrho_2\text{ol-}$  ‘to destroy’ (Pokorny 1959:777 reconstructs  $*\text{ol-}[e]-$  here): Hittite (3rd sg.) *hu-ul-la-a-i* ‘to smite, to destroy, to defeat’; Latin *ab-oleō* ‘to destroy’; Greek ὀλλῶμι ‘to destroy’. Cf. Couvreur 1937:143—144; Cowgill 1965:146—147 and 157 (Cowgill derives the Greek form from  $*\text{Ol-ne-O-mi}$  and considers the *o* to be a replacement for original  $\alpha$  — nonetheless, Cowgill accepts the comparison with Hittite *hu-ul-la-a-i*). The Hittite form directly attests  $*\varrho_2\text{ul-}$ . Note: Kloekhorst (2008b:358—360) derives the Hittite form in question from Proto-Indo-European  $*\text{h}_2\text{uelh}_1$ –:  $*\text{h}_2\text{ul-né-h}_1\text{-ti}$ ,  $*\text{h}_2\text{ul-n-h}_1\text{-énti}$



and compares Old Irish *follnadar* ‘to rule’; Latin *valeō* ‘to be powerful’; Lithuanian *vėldu* ‘to own’; Gothic *waldan* ‘to rule’; and Old Church Slavic *vladŏ* ‘to rule’. The semantics really do not match, however. Consequently, I reject this etymology. Cf. also Melchert 1994a:55—56 (*\*h<sub>2</sub>wl-ne-h<sub>1</sub>-* > Hittite *hulle-* ‘fight’), 66, and 82. Finally, Polomé (1965:18) and Puhvel (1984— .3:368) reject this etymology.

3. Early Proto-Indo-European *\*ǵ<sub>2</sub>um-* > later Proto-Indo-European *\*ǵ<sub>2</sub>om-* ‘all, whole’: Hittite (nom. sg.) *hu-u-ma-an-za* ‘all, whole’; Latin *omnis* ‘all, every, whole’. Cf. Couvreur 1937:144—146; Kronasser 1956:41; Pedersen 1938:165. The Hittite form directly attests *\*ǵ<sub>2</sub>um-*. Note: Polomé (1965:18) and Puhvel (1984— .3:380) reject this etymology — Puhvel derives Latin *omnis* from *\*opnis* (as does de Vaan 2008:428). Ernout—Meillet (1979:461—462) state that there is “nothing similar elsewhere” (“Aucun mot pareil ailleurs”) to Latin *omnis*. On the other hand, Walde—Hofmann (1965—1972.II:209—210) mention Oscan *úmbn*, which points to earlier *\*omb-nis* and not *\*opnis* as the source of both the Oscan form and Latin *omnis*. *\*omb-nis* may contain an epenthetic *b*, in which case the original form would have been *\*om-ni-s*. Here, *-ni-* is a suffix. Likewise, in Hittite *hu-u-ma-an-za*, the stem is *\*hum-*, and the *-anz(a)* is a suffix (< *\*-onts* or *\*-nts*). Thus, this etymology can be revived if we consider the original form to have been *\*ǵ<sub>2</sub>um-*, which later became *\*ǵ<sub>2</sub>om-*, with *\*-o-* from earlier *\*-u-* under the influence of the preceding laryngeal. Such an explanation overcomes the objections raised against this etymology based upon the irregular correspondence of Hittite *u* and Latin *o*.

As for *\*ǵ<sub>3</sub>*, there is a strong probability that the change of *\*i* to *\*e* under the influence of *\*ǵ<sub>3</sub>* can be observed in Hittite (nom.-acc. sg.) *še-e-hur*, *še-e-hu-ur*, *še-e-hu-wa-ar* ‘urine’, (nom. sg.) *še-e-hu-ga-ni-ya-u-wa-an-za* ‘besmeared with urine’, and (3rd sg. pret. act.) *še-e-hu-ri-ya-[a]t* ‘to urinate’ (< *\*seǵ<sub>3</sub>-ur* < *\*siǵ<sub>3</sub>-ur*), discussed above.

We may summarize our findings by setting up the following matrix:

	<i>*ǵ</i>	<i>*h</i>	<i>*ḫ</i>	<i>*ḫ̥</i>
Traditional <i>*ǵ<sub>1</sub></i> ( <i>*H<sub>1</sub></i> )	+	-	-	-
Traditional <i>*ǵ<sub>4</sub></i> ( <i>*H<sub>4</sub></i> )	-	+	-	-
Traditional <i>*ǵ<sub>2</sub></i> ( <i>*H<sub>2</sub></i> )	-	-	+	-
Traditional <i>*ǵ<sub>3</sub></i> ( <i>*H<sub>3</sub></i> )	-	-	-	+
<i>e</i> lowered and colored to <i>a</i>	-	+	+	+
<i>i</i> lowered and colored to <i>e</i>	-	+	+	+
<i>u</i> lowered and colored to <i>o</i>	-	+	+	+
Preserved in Anatolian	-	-	+	+
Partially preserved in Armenian	-	-	+	-

That completes (and updates) what I had previously written — but there is more. It is hard to envision how *\*ḫ* (= *\*ǵ<sub>2</sub>*) and *\*ḫ̥* (= *\*ǵ<sub>3</sub>*) could have become *\*x* and *\*ɣ*, which are the phonetic values commonly assigned to the reflexes of these laryngeals in the older

Anatolian languages by most specialists.<sup>28</sup> This seems to indicate that things are more complicated than previously thought. Now, my work on distant linguistic comparison indicates that, at an early stage of development, pre-Indo-European had, at the very least, the following relevant phonemes (cf. Bomhard 2021.1:76):

	Plain	Labialized
Glottal stops:	*/ʔ/	*/ʔ <sup>w</sup> /
Glottal fricative:	*/h/	
Velar fricatives: voiceless:	*/x/	*/x <sup>w</sup> /
voiced:	*/ɣ/	
Pharyngeal fricatives: voiceless:	*/ħ/	*/ħ <sup>w</sup> /
voiced:	*/ʕ/	

These phonemes remained intact at least up to what I call the “Phonemic Stress Stage” of Proto-Indo-European (cf. Bomhard 2021.1:76).<sup>29</sup> Contrary to what I had assumed when I prepared my 2021 book, it now seems likely that these phonemes also remained into the “Phonemic Pitch Stage” of Proto-Indo-European, except that \*/h/ and \*/ʕ/ became the multiply-articulated voiceless and voiced pharyngeal/laryngeal fricatives \*/ħh/ and \*/ʕh/, respectively. Prior to these changes, these laryngeals had no “vowel coloring” effects on contiguous vowels. After these changes, however, these sounds lowered contiguous vowels: \*e > \*a, original \*i > \*e and original \*u > \*o. This is extremely important, since I have maintained (Bomhard 2021.1:76) that the Anatolian branch became separated from the main speech community at the end of the “Phonemic Pitch Stage” of Proto-Indo-European. In pre-Anatolian, \*/ħh/ and \*/x/ merged into \*/x/, while \*/ʕh/ and \*/ɣ/ merged into \*/ɣ/. (At the same time, \*/ʔ/ [= \*ʔ<sub>1</sub>] and \*/h/ [= \*ʔ<sub>4</sub>] were lost.) This accounts for the reflexes found in the older Anatolian daughter languages. Things were different, however, in the Indo-European ancestor of the non-Anatolian daughter languages. Here, \*/ħh/ and \*/x/ merged into \*/ħh/, while \*/ʕh/ and \*/ɣ/ merged into \*/ʕh/. (As a typological parallel, it may be mentioned that a similar change has taken place in Hebrew, where Proto-Semitic \*/ʕ/ and \*/ɣ/ have merged into /ʕ/ [ʕ], and \*/h/ and \*/x/ have merged into /h/ [ħ] — the change was complete by the Middle Hebrew period [cf. Lipiński 2001:152—153].) Then, in the stage of development which I have called “Disintegrating Indo-European”,<sup>30</sup> the laryngeals were mostly lost. First, the laryngeals \*/ʔ/ and \*/h/ were lost initially before vowels. In all other environments, \*/ʔ/ and \*/h/ merged into \*/h/. Then, the laryngeals \*/ħh/ and \*/ʕh/ became \*/h/ (\*ħh/ > \*/h/; \*ʕh/ > \*/ħ/ > \*/h/). At this time, the single remaining

<sup>28</sup> Kümmel 2007 and Weiss 2016 argue that \*ʔ<sub>2</sub> and \*ʔ<sub>3</sub> were uvular fricatives, while Kümmel 2022 argues in favor of uvular stops.

<sup>29</sup> Recently, new terminology has been proposed to describe the various stages of development. “Indo-Anatolian” has replaced “Indo-Hittite” to describe the stage of development prior to the separation of the Anatolian branch from the main speech community. Next, “Indo-Tocharian” has been coined to describe the stage of development following the separation of Anatolian but prior to the separation of Tocharian. Finally, “Indo-European” has been retained to describe the stage following the separation of Tocharian and prior to the emergence of the remaining branches.

<sup>30</sup> This is the stage of development between the separation of the Anatolian branch from the main speech community and the emergence of the various non-Anatolian Indo-European daughter languages.

laryngeal \*/h/ had no vowel-coloring effects on contiguous vowels. Finally, this \*/h/ was lost initially before vowels (except in pre-Armenian) and medially between an immediately preceding vowel and a following non-syllabic. This latter change caused compensatory lengthening of preceding short vowels (\**eHC*, \**oHC*, \**aHC*, \**iHC*, \**uHC* > \**ēC*, \**ōC*, \**āC*, \**īC*, \**ūC*). Note: \*/h/ may have been simply lost without a trace in certain contexts (cf. Byrd 2010).

## Old Letters, New Values

Earlier in this paper, under the discussion of Carian phonology, I mentioned that new values have been assigned to several Carian letters. Let me repeat what I said (I am referring to the table prepared by Melchert 2004e:610 and given above):

Three of the letters in this table are of particular importance to our understanding of the development of laryngeals in Anatolian under investigation in this paper, namely, the letters transcribed by Melchert as /q/, /x/, and /k/. Adiego (2004:242—245) assigns slightly different values for two of the letters, namely, /k/ = Melchert's /x/ and /k̥/ = Melchert's /k/. Both Adiego and Melchert agree on /q/. Several scholars (Kloekhorst, Schürr, and Simon) have adopted the new values in recent work on Carian and Anatolian, in general — Brosch (no date) provides an excellent summary of the views of these scholars, while Simon (2021) lists the lexical evidence. However, Adiego's arguments in favor of the values he assigns to these letters are highly conjectural and based upon conflicting evidence. When one takes into consideration etymological factors, it can be observed that Carian /k/ (Melchert) ~ /k̥/ (Adiego) corresponds etymologically to /k/ in older Anatolian languages (Hittite, Palaic, and Cuneiform and Hieroglyphic Luwian), while /x/ (Melchert) ~ /k/ (Adiego) corresponds etymologically to /h/ in older Anatolian languages. /q/, on the other hand, appears to represent /x<sup>w</sup>/, just as in Lycian (see footnote 17). In my opinion, this speaks in favor of the values given by Melchert in the above table and against the values assigned by Adiego.

I want to stress that the evidence upon which the new values are based has not changed. What is new is the *interpretation*. Brosch (no date) lists the Carian vocabulary typically interpreted as containing reflexes of the laryngeals — remember that the *k* in these forms represents the Carian letter formerly interpreted as *χ* (= Melchert's *x*):

1. The element *kδ°* 'former, first' in the name *kδ-uśolš* and the controversial *kδou-* 'king' (?), which have been compared with Lycian *χñtawat(i)-* 'ruler, sovereign' (< \**h₂ent-*).
2. *p/bik°* (mostly Greek *Pig°*) 'light' in various proper names (< \**b<sup>h</sup>ēh₂-*).
3. *kb-* 'river, stream' in the place names *kbid-* 'Kaunos' and *kbo-* 'Keramos' (< \**h₂eb<sup>(h)</sup>-o/n-*).
4. *ksbo* 'ankle' in personal names (< \**h₂emsu-+-ā*) (cf. Lycian *χahba*).
5. Place name *kiδb-* (< *Hinduwa*).
6. The Greek gloss *κόov* 'sheep', perhaps also in the title *κοίολ* (< \**h₃eyi-*) (cf. Lycian *χawā*).
7. Proper name *quq-* (Greek *Gýgēs*, *Gugos*), also in proper names *dquq* (Greek *Idagygos*) (< \**h₂eyh₂o/eh₂-* 'grandfather') (cf. Lycian *χuge*).
8. Name of the Storm God *trq(u)δ-* (< \**tṛh₂unt-*) (cf. Lycian *Trqqñt-*).
9. *qdarrou-* 'servant' in personal names (cf. Cuneiform Luwian *hutarlā-*).

10. Conjunction =*q* ‘and’ (< *\*=h<sub>3</sub>e* or *\*=h<sub>2</sub>o* or *\*=k<sup>w</sup>e* ?).

11. Probably the pronoun *χiχ* (= Lycian *tike*, Milyan *kike*; Cuneiform Luwian *kuišḫa*).

Brosch mentions that there are several other items without etymologies.

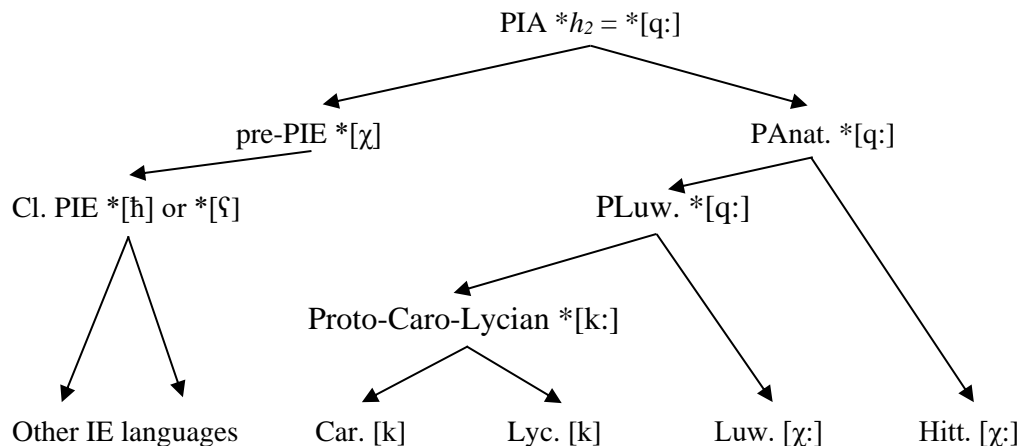
Were this all, it would not be that big an issue, given the extremely small size of the Carian corpus and the uncertainty surrounding the alleged reflexes of the laryngeals, and the debate on the values of these letters could have been confined to Carian, without too much damage. However, the new interpretation has spread to Lycian as well, and this is important. Brosch summarizes the new interpretation in the following table — he gives the names of the major scholars involved and references to the relevant publications:

Proto-Anatolian	Hittite, Palaic, Cun. Luw.	Lycian	Carian				
			Simon (2011)	Kloekhorst (2008b)	Adiego (2007)	Schürr (2001)	Adiego (1995)
<i>*H-</i>	<i>ḫ-</i>	<i>χ</i> [k]	<i>k</i> [k], <i>q</i> [q]/__ <i>u</i>	<i>k</i> [k]	<i>k</i> [k], <i>q</i> [q]	<i>k</i> [k], <i>q</i> [q]	?
<i>*-H-</i>	<i>-ḫḫ-</i>	<i>χ</i> [k]	<i>k</i> [k]				
<i>*-h-</i>	<i>-ḫ-</i>	<i>g</i> [γ]	<i>q</i> [q]	?			<i>k</i> [k]
<i>*(-)H<sup>w</sup>-</i>	<i>(-ḫ)ḫu-</i>	<i>q</i> [k <sup>w</sup> ?]	<i>qu</i> [qu] < <i>*h<sub>2</sub>u</i>	<i>q</i> [k <sup>w</sup> ]			<i>q</i> /k <sup>w</sup> /k]

The final step in the evolution of these ideas is the proposal that the laryngeals preserved in Anatolian (namely, *\*ǵ<sub>2</sub>* and *\*ǵ<sub>3</sub>*) were actually uvular stops in pre-Anatolian (cf. Kloekhorst 2018). The thinking is that they would have been preserved as stops in Lycian and Carian but changed to uvular fricatives in Hittite, Palaic, and Cuneiform and Hieroglyphic Luwian. Kloekhorst (2018:79) concludes regarding *\*ǵ<sub>2</sub>*:

We have seen that, typologically, it is difficult to understand how Lycian and Carian [k] could have been the outcome of *\*h<sub>2</sub>* if the latter sound originally was a uvular fricative. Instead, Lyc./Car. [k] is much better explained from a uvular stop, which can also account for the uvular fricative as found in Hittite and Luwian. Moreover, there are additional arguments to be given in favour of such a reconstruction, especially the fact that *\*h<sub>2</sub>* yields a fortis (long) consonant in Hittite and CLuwian.

All in all, I want to propose the following values for *\*h<sub>2</sub>* in the different language stages:



The interpretation of the laryngeals \* $\text{ʔ}_2$  and \* $\text{ʔ}_3$  as uvular stops in pre-Anatolian Proto-Indo-European (Proto-Indo-Anatolian) has major implications for the basic tenets of the Laryngeal Theory listed at the beginning of this paper. First, there is the question of the vowel-coloring effects traditionally attributed to the laryngeals. The vowel-coloring effects must have already begun in pre-Anatolian Proto-Indo-European, since they can clearly be observed in the Anatolian daughter languages. As noted by Colarusso (1981), plain uvular stops and fricatives cannot have produced these effects. Colarusso discusses, in detail, typological parallels with Northwest Caucasian, Northeast Caucasian, and Semitic to illustrate this point. Consequently, plain uvular stops and fricatives can be ruled out at the Proto-Indo-European level on this basis alone. Next, the plain pharyngeal fricatives reconstructed by Kloekhorst for the Proto-Indo-European precursor of the non-Anatolian daughter languages also cannot have produced the vowel-coloring effects traditionally attributed to the laryngeals — additional phonetic features and developments are required. (Here, it may be noted that the loss of pharyngeal fricatives, as well as other “laryngeals”, in Akkadian resulted in the change of contiguous /a/ to /e/ [cf. Lipiński 2001:149] — this is the exact opposite of the vowel-coloring effects traditionally attributed to “a-coloring laryngeals” in Proto-Indo-European.) This was illustrated above in the table of Semitic developments originally prepared by Cuvreur (1937:288—289) and is also discussed by Colarusso (1981) — instructive here as well are the typological parallels between the development of the “laryngeals” in Coptic, on the one hand, and in Proto-Indo-European, on the other hand, discussed by Greenberg (1969:175—184). It may also be noted that the laryngeals do not pattern as stops during any period of development. Finally, my work on distant linguistic comparison (cf. Bomhard 2021) does not support these views. I have given references to that monograph throughout the present paper. Moreover, my 2019 *Journal of Indo-European Studies* paper entitled “The Origins of Proto-Indo-European: The Caucasian Substrate Hypothesis”, in which I present evidence of prehistoric language contact between the precursors of Proto-Indo-European and Proto-Northwest Caucasian, does not support these views. In sum, these theories simply are not supported by the cumulative evidence.

It seems to me that the initial mistake began with the interpretation of the Carian reflexes of the laryngeals preserved in Anatolian as stops. This simply cannot be correct. Likewise, the interpretation of the Lycian reflexes of these laryngeals as stops cannot be correct. Consequently, I urge that these theories be abandoned and that the earlier values assigned to the letters in question in Carian and Lycian be reinstated. ■

## References

- Adams, Douglas Q.  
2013 *A Dictionary of Tocharian B*. Revised and greatly enlarged 2nd edition. Amsterdam and New York, NY: Rodopi.
- Adiego, Ignacio J.  
1995 “Contribuciones al descriframiento del Cario” [Contributions to the Decipherment of Carian], *Kadmos* 34:18—34.  
2007 *The Carian Language*. With an appendix by Koray Konuk. Leiden and Boston, MA: E. J. Brill.  
2010 “Recent Developments in the Decipherment of Carian”, in: Riet van Bremen and Jan-Mathieu Carbon (eds.), *Hellenistic Karia: Proceedings of the First International Conference on Hellenistic Karia, Oxford 29 June — 2 July 2006*. Bordeaux: De Boccard, pp. 147—176.  
2016 “Anatolian Languages and Proto-Indo-European”, *Veleia* 33:49—64.
- Adrados, Francisco R[odríguez]  
1961 *Estudios sobre las laringales indoeuropeas [Studies on the Indo-European Laryngeals]*. (= Manuales y anejos de “Emerita” 19.) Madrid: Consejo Superior de Investigaciones Científicas (C.S.I.C.).  
1975 *Lingüística indoeuropea [Indo-European Linguistics]*. 2 vols. Madrid: Gredos.  
1981a “Further Considerations on the Phonetics and Morphologization of *H<sup>i</sup>* and *H<sup>u</sup>* in Indo-European”, *Emerita* XLIX.1: 231—271.  
1981b “More on Laryngeals with Labial and Palatal Appendices”, *Folia Linguistica Historica* 2.2:191—235.  
1988 *Nuevos estudios de lingüística indoeuropea [New Studies in Indo-European Linguistics]*. Madrid: Instituto de Filología: Manuales y Anejos de “Emerita” XXXVII.
- Al-Ani, Salman  
1970 *Arabic Phonology*. The Hague: Mouton.
- Bader, Françoise  
1988 “Noms de parenté anatoliens et formations à laryngale” [Anatolian Names of Relationship and Laryngeal Formations], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 17—48.  
1990 “Traitements de laryngales en groupe: allongement compensatoire, assimilation, anaptyxe” [The Treatments of Laryngeals in Group: Compensatory Lengthening, Assimilation, Anaptyxis], in: Jean Kellens (ed.), *La reconstruction des laryngales [The Reconstruction of the Laryngeals]*. Paris: Société d’Édition “Les Belles Lettres”, pp. 1—47.
- Bammesberger, Alfred  
1984 *Studien zur Laryngalthorie [Studies on the Laryngeal Theory]*. Göttingen: Vandenhoeck & Ruprecht.  
1989 “The Laryngeal Theory and the Phonology of Prehistoric Greek”, in: Theo Vennemann (ed.), *The New Sound of Indo-European: Essays in Phonological Reconstruction*. Berlin and New York, NY: Mouton de Gruyter, pp. 35—41.
- Bammesberger, Alfred (ed.)  
1988 *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter.
- Barton, Charles R.  
1988 “Gk. *āesa*, Arm. *agay* and PIE *\*h<sub>1</sub>*”, in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal*

- Theory and the Reconstruction of the Indo-European Sound and Form Systems*]. Heidelberg: Carl Winter, pp. 49—58.
- Beekes, Robert S[tephen] P[aul]  
1969 *The Development of the Proto-Indo-European Laryngeals in Greek*. The Hague: Mouton.  
1981 “Intervocalic Laryngeal in Gatha-Avestan”, in: Yoël L. Arbeitman and Allan R. Bomhard (eds.), *Bono Homini Donum: Essays in Historical Linguistics in Memory of J. Alexander Kerns*. Amsterdam: John Benjamins, part I, pp. 47—64.  
1988 “Laryngeal Developments: A Survey”, in: Alfred Bammesberger (ed.), *Die Laryngaltheorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 59—105.  
1989 “The Nature of the Proto-Indo-European Laryngeals”, in: Theo Vennemann (ed.), *The New Sound of Indo-European: Essays in Phonological Reconstruction*. Berlin and New York, NY: Mouton de Gruyter, pp. 23—33.  
2010 *Etymological Dictionary of Greek*. With the assistance of Lucien van Beek. 2 vols. Leiden and Boston, MA: E. J. Brill.
- Benveniste, Émile  
1935 *Origines de la formation des noms en indo-européen [Origins of the Formation of Nouns in Indo-European]*. Paris: Adrien-Maisonneuve.  
1952 “Lycien” [Lycian], in: Antoine Meillet and Marcel Cohen (eds.), *Les langues du monde [The Languages of the World]*. Paris: Honoré Champion, vol. I, pp. 205—208.  
1954 “Études hittites et indo-européennes” [Hittite and Indo-European Studies], *Bulletin de la Société Linguistique* 50:29—43.  
1962 *Hittite et indo-européen [Hittite and Indo-European]*. Paris: Adrien-Maisonneuve.
- Blažek, Václav  
2011 “Indo-European Laryngeals in Afroasiatic Perspective”, *Journal of Language Relationship* 5:1—22.
- Boisacq, Émile  
1950 *Dictionnaire étymologique de la langue grecque: étudiée dans ses rapports avec les autres langues indo-européennes [Etymological Dictionary of the Greek Language: Studied in Its Relationships with the Other Indo-European Languages]*. 4th edition, with an index by Helmut Rix (1st edition 1916). Heidelberg: Carl Winter.
- Bomhard, Allan R.  
1976 “The Placing of the Anatolian Languages”, *Orbis* XXV.2:199—239.  
2004 “The Proto-Indo-European Laryngeals”, in: Adam Hyllested, Anders Richardt Jørgensen, Jenny Helena Larsson, and Thomas Olander (eds.), *Per Aspera ad Asteriscos. Studia Indogermanica in honorem Jens Elmegård Rasmussen sexagenarii Idibus Martiis anno MMIV [Through Hardship to the Stars: Indo-European Studies in Honor of Jens Elmegård Rasmussen on His Sixtieth Birthday, the Ides of March 2004]*. Innsbruck: Innsbrucker Beiträge zur Sprachwissenschaft, pp. 69—79.  
2016 “The Glottalic Model of Proto-Indo-European Consonantism: Re-igniting the Dialog”, *Slovo a slovesnost* 77:371—391.  
2019a “The Origins of Proto-Indo-European: The Caucasian Substrate Hypothesis”. *Journal of Indo-European Studies* 47.1/2:9—124.  
2019b “The Importance of Hittite and the Other Anatolian Daughter Languages for the Reconstruction of the Proto-Indo-European Phonological System”, *Wekʷos* 5.  
2021 *A Comprehensive Introduction to Nostratic Comparative Linguistics, With Special Reference to Indo-European*. 4th revised, corrected, and expanded edition. Published online under a Creative Commons license.

- Brosch, Cyril  
No date "Zur Vertretung der Laryngale im Karischen" [On the Treatment of the Laryngeals in Carian]. Published on-line.
- Buck, Carl D[arling]  
1949 *A Dictionary of Selected Synonyms in the Principal Indo-European Languages*. Chicago, IL: University of Chicago Press.  
[1988] [Paperback edition.]
- Byrd, Andrew  
2010 *Reconstructing Indo-European Syllabification*. Ph.D. dissertation, University of California, Los Angeles, CA.  
2015 *The Indo-European Syllable*. Leiden and Boston, MA: E. J. Brill.  
2018 "The Phonology of Proto-Indo-European", in: Jared S. Klein, Brian D. Joseph, Matthias Fritz, and Mark Wenthe (eds.), *Handbook of Comparative and Historical Indo-European Linguistics*. 3 volumes. Berlin and Boston, MA: De Gruyter Mouton, vol. III, pp. 2056—2079.
- Campbell, Lyle, and Andrew Garrett  
1993 Review of Jorma Koivulehto, *Uralische Evidenz für die Laryngalthorie [Uralic Evidence for the Laryngeal Theory]*, *Language* 69:832—836.
- Cantineau, Jean  
1960 *Cours de phonétique arabe [Course in Arabic Phonetics]*. Reprint. Paris: Librairie C. Klincksieck.
- Carruba, Onofrio  
1970 *Das Paläische: Texte, Grammatik, Lexikon [Palaic: Texts, Grammar, Lexicon]*. Wiesbaden: Otto Harrassowitz.
- Carruba, Onofrio (ed.)  
1992 *Per una grammatica ittita / Towards a Hittite Grammar*. Pavia: Gianni Iuculano Editore.
- Carter, Charles  
1988 "Indo-Hittite Again", in: Yoël L. Arbeitman, *A Linguistic Happening in Memory of Ben Schwartz*. Louvain-la-Neuve: Peeters, pp. 157—161.
- Catford, John C.  
1977 *Fundamental Problems in Phonetics*. Bloomington, IN: Indiana University Press.
- Chantraine, Pierre  
1968—1980 *Dictionnaire étymologique de la langue grecque. Histoire des mots. [Etymological Dictionary of the Greek Language. History of Words]*. 2 vols. Paris: Librairie C. Klincksieck.
- Chomsky, Noam, and Morris Halle  
1968 *The Sound Pattern of English*. New York, NY: Harper & Row.
- Christol, Alain  
1990 "Les laryngales entre phonétique et phonologie" [The Laryngeals between Phonetics and Phonology], in: Jean Kellens (ed.), *La reconstruction des laryngales [The Reconstruction of the Laryngeals]*. Paris: Société d'Édition "Les Belles Lettres", pp. 101—127.
- Collinder, Björn  
1967 "Die indouralische Sprachvergleichung und die Laryngalthorie" [The Indo-Uralic Linguistic Comparison and the Laryngeal Theory], *Die Sprache* 13:179—190.  
1970 "Nachtrag zum Aufsatz 'Die indouralische Sprachvergleichung und die Laryngalthorie'" [Addenda to the Article "The Indo-Uralic Linguistic Comparison and the Laryngeal Theory"], *Die Sprache* 16:174—175.
- Colarusso, John  
1975 *The Northwest Caucasian Languages: A Phonological Survey*. Ph.D. dissertation, Harvard University.



- 1978 “The Typology of Pharyngeals and Pharyngealization: Caucasian Examples”. Paper presented at the Sixth Meeting (April 9—10, 1978) of the Toronto North American Conference on Afro-Asiatic Linguistics.
- 1981 “Typological Parallels between Proto-Indo-European and the Northwest Caucasian Languages”, in: Yoël L. Arbeitman and Allan R. Bomhard (eds.), *Bono Homini Donum: Essays in Historical Linguistics in Memory of J. Alexander Kerns*. Amsterdam: John Benjamins, part I, pp. 475—557.
- 1992 “Phyletic Links between Proto-Indo-European and Proto-Northwest Caucasian”, in: Howard I. Aronson (ed.), *The Non-Slavic Languages of the USSR: Linguistic Studies (Second Series)*. Chicago, IL: Chicago Linguistic Society, pp. 19—54. Reprinted in *Mother Tongue* 21:8—20 (1994).
- Collinge, N[eville] E[dgar]  
1970 “The Indo-European Laryngeal”, in: N. E. Collinge, *Collectanea Linguistica: Essays in General and Genetic Linguistics*. The Hague: Mouton, pp. 67—101.
- Connolly, Leo A.  
1989 “Laryngeal Metathesis: An Aryan Peculiarity?”, in: Theo Vennemann (ed.), *The New Sound of Indo-European: Essays in Phonological Reconstruction*. Berlin and New York, NY: Mouton de Gruyter, pp. 43—51.
- Čop, Bojan  
1970 “Die indouralische Sprachverwandtschaft und die indogermanische Laryngaltheorie” [The Indo-Uralic Linguistic Comparison and the Indo-European Laryngeal Theory], *Slovenska Akademija Znanosti in Umetnosti* VII.5:185—229.
- Couvreux, Walter  
1935 *De Hittitische ḫ [Hittite ḫ]*. Leuven: Katholieke Universiteit te Leuven.  
1937 *De Hettitische Ḫ: Een Bijdrage tot de Studie van het Indo-Europeesche Vocalisme [Hittite Ḫ: A Contribution to the Study of Indo-European Vocalism]*. Louvain: Bibliothèque du Muséon.
- Cowgill, Warren  
1965 “Greek Evidence”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 142—180.
- De Saussure, Ferdinand  
1879 *Mémoire sur le système primitif des voyelles dans les langues indo-européennes [An Essay on the Primitive System of Vowels in the Indo-European Languages]*. Reprinted 1978. Hildesheim: Georg Olms. (Reprinted 2009 by Cambridge University Press.)
- De Vaan, Michiel  
2008 *Etymological Dictionary of Latin and the Other Italic Languages*. Leiden and Boston, MA: E. J. Brill.
- De Vries, Jan  
1962 *Altnordisches etymologisches Wörterbuch [Old Norse Etymological Dictionary]*. 2nd edition. Leiden: E. J. Brill.  
[1977] [Reprinted.]
- Derksen, Rick  
2008 *Etymological Dictionary of the Slavic Inherited Lexicon*. Leiden and Boston, MA: E. J. Brill.  
2015 *Etymological Dictionary of the Baltic Inherited Lexicon*. Leiden and Boston, MA: E. J. Brill.
- Dunkel, George E.  
1988 “Laryngeals and Particles: \**h*<sub>2</sub>*u*, \**u*, and \**awo*”, in: Alfred Bammesberger (ed.), *Die Laryngaltheorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 107—121.

- Eichner, Heiner  
1988 “Anatolisch und Trilaryngalismus” [Anatolian and Three Laryngeals], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems* [*The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems*]. Heidelberg: Carl Winter, pp. 123—151.
- Ernout, Alfred, and Antoine Meillet  
1979 *Dictionnaire étymologique de la langue latine: Histoire des mots* [*Etymological Dictionary of the Latin Language: History of Words*]. 4th edition. Paris: Librairie C. Klincksieck.
- Fordyce, James F.  
1980 “On the Nature of Glottalic and Laryngealized Consonant and Vowel Systems”, in: *UCLA Working Papers in Phonetics*, no. 50. Los Angeles, CA: UCLA Department of Linguistics, pp. 122—154.
- Fortson, Benjamin W., IV  
2010 *Indo-European Language and Culture: An Introduction*. 2nd edition. Chichester: Wiley-Blackwell.
- Frisk, Hjalmar  
1970—1973 *Griechisches etymologisches Wörterbuch* [*Greek Etymological Dictionary*]. 3 vols. Heidelberg: Carl Winter.
- Gamkrelidze, Thomas V[aler’anovič]  
1968 “Hittite and the Laryngeal Theory”, in: J. C. Heesterman, G. H. Schokker, and V. I. Subramoniam (eds.), *Pratidānam: Indian, Iranian and Indo-European Studies Presented to Franciscus Bernardus Kuipers on his Sixtieth Birthday*. The Hague: Mouton, pp. 89—97.  
1982 “Problems of Consonantism of the Cuneiform Hittite Language”, in: J. N. Postgate (ed.), *Societies and Languages of the Ancient Near East: Studies in Honour of I. M. Diakonoff*. Warminster: Aris and Phillips, pp. 76—80.
- Gamkrelidze, Thomas V., and Vjačeslav V. Ivanov  
1995 *Indo-European and the Indo-Europeans: A Reconstruction and Historical Typological Analysis of a Protolanguage and a Proto-Culture*. 2 vols. English translation by Johanna Nichols. Berlin, New York, NY, and Amsterdam: Mouton de Gruyter.
- Greenberg, Joseph H.  
1969 “Some Methods of Dynamic Comparison in Linguistics”, in: Jaan Puhvel (ed.), *Substance and Structure of Language*. Berkeley and Los Angeles, CA: University of California Press, pp. 147—203.
- Greppin, John A. C.  
1988 “Laryngeal Residue in Armenian: Genetic and Loan Evidence”, in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems* [*The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems*]. Heidelberg: Carl Winter, pp. 179—193.
- Gusmani, Roberto  
1964 *Lydisches Wörterbuch* [*Lydian Dictionary*]. Heidelberg: Carl Winter.  
[1980—1982] [2nd edition.]  
1979c “Ittito, teoria laringalistica e ricostruzione” [Hittite, Laryngeal Theory, and Reconstruction], in: Erich Neu and Wolfgang Meid (eds.), *Hethitisch und Indogermanisch* [*Hittite and Indo-European*]. Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck, pp. 63—71.
- Güterbock, Hans, and Harry A. Hoffner, Jr. (eds.)  
1980— *The Hittite Dictionary of the University of Chicago*. Chicago, IL: The Oriental Institute of the University of Chicago.
- Hammerich, Louis  
1948 *Laryngeal before Sonant*. Copenhagen: Munksgaard.

- Hamp, Eric P.  
1965a “Evidence in Albanian”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 123—141.  
1965b “Evidence in Celtic”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 224—235.
- Hasselbach-Andee, Rebecca  
2020 “Akkadian”, in: Rebecca Hasselbach-Andee (ed.), *A Companion to Ancient Near Eastern Languages*. Hoboken, NJ: John Wiley & Sons, Inc., pp. 129—147.
- Hawkins, David, Anna Murpurgo Davies, and Günter Neumann  
1974 *Hittite Hieroglyphs and Luwian: New Evidence for the Connection*. Göttingen: Vandenhoeck and Ruprecht.
- Hoenigswald, Henry M.  
1965 “Indo-Iranian Evidence”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 93—99.  
1988 “A Note on Semivowel Behavior and its Implications for the Laryngeals”, in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 59—105.
- Hoffner, Harry A., Jr., and H. Craig Melchert  
2008 *A Grammar of the Hittite Language*. 2 volumes. Winona Lake, IN: Eisenbrauns.
- Hofmann, J[ohann] B[aptist]  
1966 *Etymologisches Wörterbuch des Griechischen [Etymological Dictionary of Greek]*. Munich: R. Oldenbourg Verlag.
- Hopper, Paul J.  
1973 “Glottalized and Murmured Occlusives in Indo-European”, *Glossa* 7:141—166.  
1977a “The Typology of the Proto-Indo-European Segmental Inventory”, *Journal of Indo-European Studies* 5.1:41—53.  
1977b “Indo-European Consonantism and the ‘New Look’”, *Orbis* XXVI.1:57—72.  
1981 “‘Decem’ and ‘Taihun’ Languages: An Indo-European Isogloss”, in: Yoël L. Arbeitman and Allan R. Bomhard (eds.), *Bono Homini Donum: Essays in Historical Linguistics in Memory of J. Alexander Kerns*. Amsterdam: John Benjamins, part I, pp. 133—142.  
1982 “Areal Typology and the Early Indo-European Consonant System”, in: Edgar C. Polomé (ed.), *The Indo-Europeans in the Fourth and Third Millennia*. Ann Arbor, MI: Karoma Publishers, pp. 121—139.  
1990 “A Glottalic Interpretation of the Germanic EXPRESSIVE GEMINATION”, in: Jerold A. Edmondson, Crawford Feagin, and Peter Mühlhäusler (eds.), *Development and Diversity: Language Variation across Time and Space. A Festschrift for Charles-James N. Bailey*. Arlington, TX: The Summer Institute of Linguistics and the University of Texas at Arlington, pp. 85—93.
- Hyllested, Adam  
2009 “Internal Reconstruction vs. External Comparison: The Case of the Indo-Uralic Laryngeals”, in: Jens Elmegård Rasmussen and Thomas Olander (eds.), *Internal Reconstruction in Indo-European: Methods, Results, and Problems. Section Papers from the XVI International Conference on Historical Linguistics, University of Copenhagen, 11—15 August 2003*. Copenhagen: Museum Tusculanum Press, pp. 111—136.
- Jakobson, Roman  
1971(1956) “Mufaxxama: The ‘Emphatic’ Phonemes in Arabic”, in: Roman Jakobson, *Selected Writings*. 2nd edition. The Hague: Mouton, vol. I, pp. 510—522. (Written in Cambridge, MA, in 1956 and published in: *Studies Presented to Joshua Whatmough* [The Hague: Mouton, 1957].)

- Jamison, Stephanie W.  
1988 "The Quantity and Outcome of Vocalized Laryngeals in Indic", in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 213—226.
- Jonsson, Hans  
1978 *The Laryngeal Theory: A Critical Survey*. Lund: Gleerup.
- Kaiser, Mark, and Vitalij Shevoroshkin  
1985 "On Indo-European Laryngeals and Vowels", *Journal of Indo-European Studies* 13.3/4:377—413.
- Keiler, Allan R.  
1970 *A Phonological Study of the Indo-European Laryngeals*. The Hague: Mouton.
- Kellens, Jean (ed.)  
1990 *La reconstruction des laryngales [The Reconstruction of the Laryngeals]*. Paris: Société d'Édition "Les Belles Lettres".
- Kerns, J. Alexander, and Benjamin Schwartz  
1940 "The Laryngeal Hypothesis and Indo-Hittite, Indo-European Vocalism", *Journal of the American Oriental Society* 60:181—192.  
1963a "Initial Laryngeals in Tocharian", *Journal of the American Oriental Society* 83.2:361—362.
- Kessler, Brett  
No Date "On the Phonological Nature of the Proto-Indo-European Laryngeals" (download: <http://spell.psychology.wustl.edu/PIE-laryngeals/>).
- Kimball, Sara E.  
1987 "H<sub>3</sub> in Anatolian", in: George Cardona and Norman H. Zide (eds.), *Festschrift for Henry Hoenigswald on the Occasion of His Seventieth Birthday*. Tübingen: Gunter Narr, pp. 185—192.  
1988 "Analogy, Secondary Ablaut and \*OH<sub>2</sub> in Common Greek", in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 241—256.  
1999 *Hittite Historical Phonology*. Innsbruck: Innsbrucker Beiträge zur Sprachwissenschaft.  
2017 "The Phonology of Anatolian", in: Jared S. Klein, Brian D. Joseph, Matthias Fritz, and Mark Wenthe (eds.), *Handbook of Comparative and Historical Indo-European Linguistics*. 3 volumes. Berlin and Boston, MA: De Gruyter Mouton, vol. I, pp. 249—256.
- Klein, Jared S.  
1988 "Proto-Indo-European \*g<sup>w</sup>iH<sub>3</sub>- 'live' and Related Problems of Laryngeals in Greek", in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 257—279.
- Klimov, G[eorgij] A[ndrejevič]  
1989 "Рефлекс индоевропейского ларингального картвельских языках?" [A Reflex of an Indo-European Laryngeal in Kartvelian Languages?], *Вопросы Языкознания (Voprosy Jazykoznanija)* 1989.6:23—28.
- Kloekhorst, Alwin  
2005 "The Fate of PIE \*h<sub>3</sub>- in Hittite". Manuscript. Downloaded from academia.edu.  
2006 "Initial Laryngeals in Anatolian", *Historische Sprachforschung*, 119:77—108.  
2008a *Etymological Dictionary of the Hittite Inherited Lexicon*. Leiden and Boston, MA: E. J. Brill.  
2008b "Studies in Lycian and Carian Phonology and Morphology", *Kadmos* 47:137—145.

- 2016 “The Anatolian Stop System and the Indo-Hittite Hypothesis”, *Indogermanische Forschungen* 121:213–247.
- 2018 “Anatolian Evidence Suggests that the Indo-European Laryngeals Were Uvular Stops”, *Indo-European Linguistics* 6:69–94.
- 2022 “Anatolian”, in: Thomas Olander (ed.), *The Indo-European Language Family: A Phylogenetic Perspective*. Cambridge: Cambridge University Press, pp. 63–82.
- Koivulehto, Jorma  
1988 “Idg. Laryngale und die finnisch-ugrische Evidenz” [Indo-European Laryngeals and the Finno-Ugrian Evidence], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formen-systems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 281–297.
- 1992 *Uralic Evidence for the Laryngeal Theory*. Vienna: Publishing House of the Austrian Academy of Sciences.
- Kortlandt, Frederik [Herman Henri]  
1988 “The Laryngeal Theory and Slavic Accentuation”, in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formen-systems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 299–311.
- 2001 “Initial Laryngeals in Anatolian”. Manuscript. Downloaded from academia.edu.
- Kronasser, Heinz  
1956 *Vergleichende Laut- und Formenlehre des Hethitischen [Comparative Phonology and Morphology of Hittite]*. Heidelberg: Carl Winter.
- 1966 *Etymologie der hethitischen Sprache [Etymology of the Hittite Language]*. Vol. 1. Wiesbaden: Otto Harrassowitz.
- Kroonen, Guus  
2013 *Etymological Dictionary of Proto-Germanic*. Leiden and Boston, MA: E. J. Brill.
- Kümmel, Martin J.  
2007 *Konsonantenwandel*. Wiesbaden: Reichert.
- 2022 “On New Reconstructions of PIE “laryngeals”, Especially as Uvular Stops”, *Acta Linguistica Petropolitana* 18.1:199–215.
- Kuryłowicz, Jerzy  
1935 *Études indoeuropéennes I [Indo-European Studies I]*. Kraków: Polish Academy.
- Laroche, Emmanuel  
1959 *Dictionnaire de la langue louvite [Dictionary of the Luwian Language]*. Paris: Adrien-Maisonneuve.
- 1960 *Les hiéroglyphes hittites [The Hittite Hieroglyphs]*. Vol. I. Paris: Centre National de la Recherche Scientifique.
- 1986 “Les laryngales de l’anatolien: état des questions” [The Laryngeals of Anatolian: State of the Matter], *Comptes-rendus des séances de l’Académie des Belles-Lettres*, 130e année, no. 1 (1986), pp. 134–140.
- Lehmann, Winfred P.  
1952 *Proto-Indo-European Phonology*. Austin, TX: University of Texas Press.
- 1965 “Germanic Evidence”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 212–223.
- Lindeman, Frederik Otto  
1970 *Einführung in die Laryngalthorie [Introduction to the Laryngeal Theory]*. Berlin: Walter de Gruyter.
- 1987 *Introduction to the “Laryngeal Theory”*. Oslo: Norwegian University Press.
- [1997] [Revised edition. Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck.]

- Lipiński, Edward  
2001 *Semitic Languages: Outline of a Comparative Grammar*. 2nd edition. Louvain / Leuven: Peeters.
- Lubotsky, A[lexander] M.  
1989 “Against a Proto-Indo-European Phoneme *\*a*”, in: Theo Vennemann (ed.), *The New Sound of Indo-European: Essays in Phonological Reconstruction*. Berlin and New York, NY: Mouton de Gruyter, pp. 53—66.  
1990 “La loi de Brugmann et *\*H<sub>3</sub>e-*” [Brugmann’s Law and *\*H<sub>3</sub>e-*], in: Jean Kellens (ed.), *La reconstruction des laryngales [The Reconstruction of the Laryngeals]*. Paris: Société d’Édition “Les Belles Lettres”, pp. 129—136.
- Mallory, James P., and Douglas Q. Adams  
2006 *The Oxford Introduction to Proto-Indo-European and the Proto-Indo-European World*. Oxford and New York, NY: Oxford University Press.
- Mallory, James P., and Douglas Q. Adams (eds.)  
1997 *Encyclopedia of Indo-European Culture*. London and Chicago, IL: Fitzroy Dearborn Publishers.
- Mann, Stuart E.  
1984—1987 *An Indo-European Comparative Dictionary*. Hamburg: Helmut Buske.
- Markey, Thomas L.  
1988 “The Laryngeal Theory and Aspects of Germanic Phonology”, in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 313—326.
- Martinet, André  
1975(1967) “Les laryngales” [The Laryngeals], in: André Martinet, *Évolution des langues et reconstruction [Evolution of Languages and Reconstruction]*. Vendôme: Presses Universitaires de France, pp. 114—168. (Originally published in: *Phonetica* I [1967].)
- Martirosyan, Hrach  
2008 *Studies in Armenian Etymology, with Special Emphasis on Dialects and Culture. Indo-European Heritage*. Ph.D. dissertation, Leiden University.
- Matasović, Ranko  
2009 *Etymological Dictionary of Proto-Celtic*. Leiden and Boston, MA: E. J. Brill.
- Mayrhofer, Manfred  
1956—1980 *Kurzegefaßtes etymologisches Wörterbuch des Altindischen [A Concise Etymological Dictionary of Old Indic]*. 4 vols. Heidelberg: Carl Winter.  
1986—2001 *Etymologisches Wörterbuch des Altindoarischen [Etymological Dictionary of Old Indo-Aryan]*. 3 vols. Heidelberg: Carl Winter.  
1988 “Die Laryngalthorie im phonologischen Halbband der ‘Indogermanischen Grammatik’” [The Laryngeal Theory in the Phonological Half of the “Indo-European Grammar”], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 327—332.
- Meid, Wolfgang  
1988 “Einige persönliche und sachliche Bemerkungen zur Laryngalthorie” [Some Personal and Pertinent Remarks on the Laryngeal Theory], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 333—353.
- Melchert, H. Craig  
1984 *Studies in Hittite Historical Phonology*. Göttingen: Vandenhoeck & Ruprecht.  
1987 “Reflexes of *\*h<sub>3</sub>* in Anatolian”, *Die Sprache* 33:19—28.

- 1989 *Lycian Lexicon*. Chapel Hill, NC: The Author.  
 [1993] [2nd fully revised edition.]  
 1993b *Cuneiform Luvian Lexicon*. Chapel Hill, NC: The Author.  
 1994a *Anatolian Historical Phonology*. Amsterdam and Atlanta, GA: Rodopi.  
 1994b “Anatolian”, in: Françoise Bader (ed.), *Langues indo-européennes [Indo-European Languages]*. Paris: CNRS Éditions, pp. 121—136.  
 1997 “Hittite Phonology”, in: Alan S. Kaye (ed.), *Phonologies of Asia and Africa*. Winona Lake, IN: Eisenbrauns, vol. 2, pp. 555—567.  
 2003 “Language”, in: H. Craig Melchert (ed.), *The Luwians*. Leiden and Boston, MA: E. J. Brill.  
 2004a “Luvian”, in: Roger D. Woodard (ed.), *The Cambridge Encyclopedia of the World’s Ancient Languages*. Cambridge: Cambridge University Press, pp. 576—584.  
 2004b “Palaic”, in: Roger D. Woodard (ed.), *The Cambridge Encyclopedia of the World’s Ancient Languages*. Cambridge: Cambridge University Press, pp. 585—590.  
 2004c “Lycian”, in: Roger D. Woodard (ed.), *The Cambridge Encyclopedia of the World’s Ancient Languages*. Cambridge: Cambridge University Press, pp. 591—600.  
 2004d “Lydian”, in: Roger D. Woodard (ed.), *The Cambridge Encyclopedia of the World’s Ancient Languages*. Cambridge: Cambridge University Press, pp. 601—608.  
 2004e “Carian”, in: Roger D. Woodard (ed.), *The Cambridge Encyclopedia of the World’s Ancient Languages*. Cambridge: Cambridge University Press, pp. 609—613.  
 2004f *A Dictionary of the Lycian Language*. Ann Arbor, MI, and New York, NY: Beech Stave Press.  
 2017 “Anatolian”, in: Mate Kapović (ed.), *The Indo-European Languages*. 2nd edition. London and New York, NY: Routledge, pp. 171—201.  
 2020 “Luwian”, in: Rebecca Hasselbach-Andee (ed.), *A Companion to Ancient Near Eastern Languages*. Hoboken, NJ: John Wiley & Sons, Inc., pp. 239—256.
- Melchert, H. Craig (ed.)  
 2003 *The Luwians*. Leiden and Boston, MA: E. J. Brill.
- Messing, Gordon M[yron]  
 1947 “Selected Studies in Indo-European Phonology”, *Harvard Studies in Classical Philology* 56/57:161—232.
- Militarëv, Alexander Y.  
 2011 “A Complete Etymology-Based Hundred Wordlist of Semitic Updated: Items 35—54”, *Journal of Language Relationship* 5:69—95.
- Möller, Hermann  
 1917 *Die semitisch-vorindogermanisch laryngalen Konsonanten [The Semitic/Pre-Indo-European Laryngeal Consonants]*. Copenhagen: Andr. Fred. Host and Son.
- Moscatti, Sabatino (ed.)  
 1964 *An Introduction to the Comparative Grammar of the Semitic Languages*. Wiesbaden: Otto Harrassowitz.
- Norbruis, Stefan  
 2021 *Indo-European Origins of Anatolian Morphology and Semantics. Innovations and Archaisms in Hittite, Luwian and Lycian*. Amsterdam: LOT.
- Oettinger, Norbert  
 1988 “Der indogermanische Nominativ Dual aus laryngalistische Sicht” [The Indo-European Nominative Dual from a Laryngeal Point of View], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 355—359.
- Olander, Thomas (ed.)  
 2022 *The Indo-European Language Family: A Phylogenetic Perspective*. Cambridge: Cambridge University Press.

- Orël, Vladimir  
 1998 *Albanian Etymological Dictionary*. Leiden: E. J. Brill.  
 2003 *A Handbook of Germanic Etymology*. Leiden: E. J. Brill.
- Patri, Sylvain  
 2019 *Phonologie Hittite*. Leiden: E. J. Brill.
- Payne, Annick  
 2010a “‘Writing’ in Hieroglyphic Luwian”, in: Itamar Singer (ed.), *Luwian and Hittite Studies Presented to J. David Hawkins on the Occasion of His 70th Birthday*. Tel Aviv: Emery and Claire Yass Publications in Archaeology — Institute of Archaeology, Tel Aviv University, pp. 182—187.  
 2010b *Hieroglyphic Luwian: An Introduction with Original Texts*. 2nd revised edition. Wiesbaden: Harrassowitz Verlag.  
 2015 *Schrift und Schriftlichkeit: Die anatolische Hieroglyphenschrift [Writing and Literacy: The Anatolian Hieroglyphic Script]*. Wiesbaden: Otto Harrassowitz.
- Pedersen, Holger  
 1938 *Hittitisch und die anderen indoeuropäischen Sprachen [Hittite and the Other Indo-European Languages]*. Copenhagen: Levin and Munksgaard.  
 1945 *Lykisch und Hittitisch [Lycian and Hittite]*. Copenhagen: Ejnar Munksgaard.
- Penney, J[ohn] H. W.  
 1988 “Laryngeals and the Indo-European Root”, in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 361—372.
- Peters, Martin  
 1980 *Untersuchungen zur Vertretung der indogermanischen Laryngale im Griechischen [Investigations into the Treatment of the Indo-European Laryngeals in Greek]*. Vienna: Österreichischen Akademie der Wissenschaften.  
 1988 “Zur Frage strukturell uneinheitlicher Laryngalreflexe in idg. Einzelsprachen” [On the Question of Structurally Irregular Laryngeal Reflexes in Individual Indo-European Languages], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 373—381.
- Petráček, Karel  
 1981 “K teorie laryngál” [On the Laryngeal Theory], *Slovo a Sloves-nost* 42:262—268.
- Pirart, Eric  
 1990 “Le traitement des laryngales finales en védique ancien” [The Treatment of Final Laryngeals in Ancient Vedic], in: Jean Kellens (ed.), *La reconstruction des laryngales [The Reconstruction of the Laryngeals]*. Paris: Société d’Édition “Les Belles Lettres”, pp. 137—147.
- Pokorny, Julius  
 1959—1969 *Indogermanisches etymologisches Wörterbuch [Indo-European Etymological Dictionary]*. 2 vols. Bern: Francke Verlag.
- Polomé, Edgar C.  
 1950 “Reflexes de laryngales en arménien” [Reflexes of Laryngeals in Armenian], *Annuaire de l’Institut de Philologie et d’Histoire Orientales et Slaves* 10:539—569.  
 1952 “On the Origin of Hittite *h*”, *Language* 28:444—446.  
 1965 “The Laryngeal Theory So Far”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 9—78.  
 1971 “Reflexes of Laryngeals in Indo-Iranian with Special Reference to the Problem of the Voiceless Aspirates”, in: J. Weinstock (ed.), *Saga og Språk: Studies in Language and Literature in Honor of Lee Hollander*. Austin, TX: Pemberton Press, pp. 233—250.



- 1980 “Armenian and the Proto-Indo-European Laryngeals”, in: John A. C. Greppin (ed.), *First International Conference on Armenian Linguistics, Proceedings*. Delmar, NY: Caravan Books, pp. 17—33.
- 1987 “Recent Developments in the Laryngeal Theory”, *Journal of Indo-European Studies* 15.1/2:159—167.
- 1988 “Are There Traces of Laryngeals in Germanic?”, in: Alfred Bammesberger (ed.), *Die Laryngaltheorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 383—414.
- Pooth, Roland  
2015 “A Typological Overview of Proto-Indo-European.” Manuscript. Available for free download from academia.edu.
- Puhvel, Jaan  
1960 *Laryngeals and the Indo-European Verb*. Berkeley and Los Angeles, CA: University of California Press.
- 1965 “Evidence in Anatolian”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 79—92.
- 1984— *Hittite Etymological Dictionary*. Berlin, New York, NY, and Amsterdam: Mouton de Gruyter.
- Pyysalo, Jouno  
2013 *System PIE: The Primary Phoneme Inventory and Sound Law System for Proto-Indo-European*. Ph.D. dissertation, University of Helsinki. (Publications of the Institute for Asian and African Studies, 15.) Helsinki: Unigrafia.
- 2015 “Does the Laryngeal Theory Have a Theory? On the Incompatibility of a Viable Three-Laryngeal Model with the Anatolian Data”, *Wekʷos* 2.
- Reynolds, Elinor, Paula West, and John Coleman  
2000 “Proto-Indo-European ‘Laryngeals’ were Vocalic”, *Diachronica* XVII.2:351—387.
- Ringe, Donald  
1988 “Laryngeal Isoglosses in the Western Indo-European Languages”, in: Alfred Bammesberger (ed.), *Die Laryngaltheorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 415—441.
- Rix, Helmut  
2001 *Lexikon der indogermanischen Verben [Lexicon of Indo-European Verbs]*. 2nd edition. Wiesbaden: Dr. Ludwig Reichert Verlag
- Rosenkranz, Bernhard  
1978 *Vergleichende Untersuchungen der altanatolischen Sprachen [Comparative Investigations on the Old Anatolian Languages]*. The Hague: Mouton.
- 1979 “Archaismen im Hethitischen” [Archaic Features in Hittite], in: Erich Neu and Wolfgang Meid (eds.), *Hethitisch und Indogermanisch [Hittite and Indo-European]*. Innsbruck: Institut für Sprachwissenschaft der Universität Innsbruck, pp. 219—229.
- Ruijgh, C[ornelis] J[ord]  
1988 “Observations sur les traitements des laryngales en grec préhistorique” [Observations on the Treatments of Laryngeals in Prehistoric Greek], in: Alfred Bammesberger (ed.), *Die Laryngaltheorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 443—469.
- Salmons, Joseph C.  
1993 *The Glottalic Theory: Survey and Synthesis*. McLean, VA: Institute for the Study of Man.
- Sapir, Eduard  
1938 “Glottalized Continuants in Navaho, Nootka, and Kwakiutl (with a Note on Indo-European)”, *Language* 14:248—274.

- Schmidt, Klaus T.  
1988 “Stellungsbedingte Konsonantisierung von  $\varrho_2$  im Tocharischen?” [Was There a Positionally Conditioned Occlusivization of  $\varrho_2$  in Tocharian?], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 471—480.
- Schmitt, Rüdiger  
1988 “Betrachtungen über Pragmatik und Systematik in der Laryngalthorie” [Reflections on Pragmatics and Systematics in the Laryngeal Theory], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 481—495.
- Schrijver, Peter  
1991 *The Reflexes of the Proto-Indo-European Laryngeals in Latin*. Amsterdam and Atlanta, GA: Rodopi.
- Schürr, Diether  
2001 “Karische und lykische Sibilanten” [Carian and Lycian Sibilants], *Indogermanische Forschungen* 106:94—121.
- Schwartz, Benjamin  
1970 “Laryngeals: A Brief Sketch of the Current Status of the Theory”, in: Robert C. Lugton and Milton Saltzer (eds.), *Studies in Honor of J. Alexander Kerns*. The Hague: Mouton, pp. 95—102.
- Seebold, Elmar  
1988 “Wissenschaftsgeschichte und Theorieformulierung. Oder: Wie nötig ist die Laryngalhypothese?” [Scientific History and Theoretical Formulation. Or: How Necessary is the Laryngeal Theory?], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 497—525.
- Shevoroshkin, Vitalij [Vitaly]  
1988a “On Laryngeals”, in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 527—546.  
1988b “Indo-European Consonants in Anatolian”, in: Yoël L. Arbeitman, *A Linguistic Happening in Memory of Ben Schwartz*. Louvain-la-Neuve: Peeters, pp. 283—303.  
1991 “On Carian Language and Writing”, in: Roger Pearson (ed.), *Perspectives on Indo-European Language, Culture and Religion: Festschrift for Edgar C. Polomé*. McLean, VA: Institute for the Study of Man, vol. 1, pp. 117—135.  
2000 “Notes on Lycian and Milyan”, in: Yoël L. Arbeitman (ed.), *The Asia Minor Connection: Studies on the Pre-Greek Languages in Memory of Charles Carter*. Leuven and Paris: Peeters, pp. 205—211.  
2012 “Anatolian Laryngeals in Milyan”, in: Benedicte Nielsen Whitehead, Thomas Olander, Birgit Anette Olsen, and Jens Elmegård Rasmussen (eds.), *The Sound of Indo-European: Phonetics, Phonemics, and Morphophonemics*. Copenhagen: Museum Tusculanum Press, University of Copenhagen, pp. 459—484.
- Sihler, Andrew L.  
1988 “Greek Reflexes of Syllabic Laryngeals with a Postscript on PIE Kinship Terms in  $*-H_2ter$ ”, in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indo-germanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 547—561.

- Simon, Zsolt  
2008 Review of Ignacio J. Adiego, *The Carian Language*, *Acta Ant. Hung.* 48:457—475.  
2011 “Die Fortsetzung der Laryngale im Karischen” [The Continuation of the Laryngeals in Carian], in: Thomas Krisch and Thomas Lindner (eds.), *Indogermanistik und Linguistik im Dialog. Akten der XIII. Fachtagung der Indogermanischen Gesellschaft vom 21. bis 27. September 2008 in Salzburg [Indo-European Studies and Linguistics in Dialog. Proceedings of the 13th Meeting of the Indo-European Society, 21—27 September 2008, in Salzburg]*. Wiesbaden: Reichert, pp. 538—547.  
2014 “Die phonetische Wert der luwischen Laryngale” [The Phonetic Value of the Luwian Laryngeals], in: Piotr Taracha (ed.), with the assistance of Magdalena Kapeluś, *Proceedings of the Eighth International Congress of Hittitology, Warsaw, 5—9 September 2011*. Warsaw: Agade, pp. 873—894.  
2020 “The Anatolian Stop System and the Indo-Hittite Hypothesis — Revisited”, in: Matilde Serangeli and Thomas Olander (eds.), *Dispersals and Diversification: Linguistic and Archaeological Perspectives on the Early Stages of Indo-European*. Leiden and Boston, MA: E. J. Brill, pp. 236—250.  
2021 “Entries published in the Digital Philological-Etymological Dictionary of Minor Ancient Anatolian Corpus Languages (eDiAna)”. Published on-line, 26 May 2021.
- Smoczyński, Wojciech  
2006 *Laringalų teorija ir lietuvių kalba [The Laryngeal Theory and the Lithuanian Language]*. Vilnius: Lithuanian Language Institute.
- Strunk, Klaus  
1988 “Über Laryngale und einige reduplizierte Verbalstämme” [On Laryngeals and Several Reduplicated Verbal Stems], in: Alfred Bammesberger (ed.), *Die Laryngalthorie und die Rekonstruktion des indogermanischen Laut- und Formensystems [The Laryngeal Theory and the Reconstruction of the Indo-European Sound and Form Systems]*. Heidelberg: Carl Winter, pp. 563—582.
- Sturtevant, Edgar H[oward]  
1933 *A Comparative Grammar of the Hittite Language*. Baltimore, MD: Linguistic Society of America.  
[1951] [Revised edition. Vol. I. New Haven, CT: Yale University Press.]  
1938 “Hittite Evidence against Full-Grade *o*”, *Language* 14:104—111.  
1942 *The Indo-Hittite Laryngeals*. Baltimore, MD: Linguistic Society of America.
- Swiggers, Pierre  
1989 “On (the Nature of) Proto-Indo-European Laryngeals”, in: Theo Vennemann (ed.), *The New Sound of Indo-European: Essays in Phonological Reconstruction*. Berlin and New York, NY: Mouton de Gruyter, pp. 77—79.
- Szemerényi, Oswald  
1973 “La théorie des laryngales de Saussure à Kuryłowicz et à Benveniste” [The Laryngeal Theory from Saussure to Kuryłowicz and Benveniste], *Bulletin de la Société de Linguistique* LXVIII:1—25.  
1979 “Palaic and the Indo-European Laryngeals”, in: *Florilegium Anatolicum: Mélanges offerts à E. Laroche [Anatolian Cullings: Miscellanea Offered to E. Laroche]*. Paris: Éditions E. de Boccard, pp. 315—319.
- Tischler, Johann  
1977— *Hethitisches etymologisches Wörterbuch [Hittite Etymological Dictionary]*. Innsbruck: Innsbrucker Beiträge zur Sprachwissenschaft.
- Vaux, Bert  
2001 “A Note on Pharyngeal Features”. Manuscript.
- Von Soden, Wolfram  
1995 *Grundriß der akkadischen Grammatik [Elements of Akkadian Grammar]*. 3rd edition. Rome: Pontificium Institutum Biblicum.

- Walde, Alois  
1927—1932 *Vergleichendes Wörterbuch der indogermanischen Sprachen [Comparative Dictionary of the Indo-European Languages]*. Revised and edited by Julius Pokorny. 3 vols. Reprinted 1973. Berlin: Walter de Gruyter.
- Walde, Alois, and Johann Baptist Hofmann  
1965—1972 *Lateinisches etymologisches Wörterbuch [Latin Etymological Dictionary]*. 3 vols. 5th edition. Heidelberg: Carl Winter.
- Walker, C. B. F.  
1998 “Cuneiform”, in: J. T. Hooker (ed.), *Reading the Past: Ancient Writing from Cuneiform to the Alphabet*. Originally published in 1990 by the Trustees of the British Museum. Reprinted 1998 by Barnes & Noble, Inc., by arrangement with The British Museum Company, Limited.
- Watkins, Calvert  
1965a “Evidence in Balto-Slavic”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 116—122.  
1965b “Evidence in Italic”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 181—189.  
1975 “Reflexes of Laryngeals in Certain Morphological Categories in the Indo-European Languages of Anatolia”, in: Calvert Watkins (ed.), *Indo-European Studies II*. Cambridge, MA: Harvard University Press, pp. 1—27.  
2004 “Hittite”, in: Roger D. Woodard (ed.), *The Cambridge Encyclopedia of the World’s Ancient Languages*. Cambridge: Cambridge University Press, pp. 551—575.
- Watkins, Calvert (ed.)  
1985 *The American Heritage Dictionary of Indo-European Roots*. Boston, MA: Houghton Mifflin Company.  
[1992] [Revised edition. Included as an Appendix to the 3rd edition of the *American Heritage Dictionary of the English Language*. Boston, MA: Houghton Mifflin Co., pp. 2090—2134.]  
[2000] [2nd edition.]  
[2011] [3rd edition.]
- Watson, Janet C. E.  
2002 *The Phonology and Morphology of Arabic*. Oxford and New York, NY: Oxford University Press.
- Weiss, Michael  
2016 “The Proto-Indo-European Laryngeals and the Name of Cilicia in the Iron Age”, in: Andrew M. Byrd, Jessica DeLisi, and Mark Wenthe (eds.), *Tavet Tat Satyam. Studies in Honor of Jared S. Klein on the Occasion of His Seventieth Birthday*. Ann Arbor, MI, and New York, NY: Beech Stave Press, pp. 331—340.
- Werner, Rudolf  
1991 *Kleine Einführung ins Hieroglyphen-Luwische [A Short Introduction to Hieroglyphic Luwian]*. Göttingen: Vandenhoeck and Ruprecht.
- Winter, Werner  
1965a “Armenian Evidence”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 100—115.  
1965b “Tocharian Evidence”, in: Werner Winter (ed.), *Evidence for Laryngeals*. The Hague: Mouton, pp. 190—211.
- Winter, Werner (ed.)  
1965 *Evidence for Laryngeals*. The Hague: Mouton.
- Wodtko, Dagmar, Britta Irslinger, and Carolin Schneider  
2008 *Nomina im indogermanischen Lexikon [Nouns in the Indo-European Lexicon]*. Heidelberg: Carl Winter.

- Woodhouse Robert  
2013 “On the Reality of the Laryngeal Theory: A Response to Witold Mańczak”, *Historische Sprachforschung / Historical Linguistics* 126:3—32.
- Woods, Christopher  
2020 “The Emergence of Cuneiform Writing”, in: Rebecca Hasselbach-Andee (ed.), *A Companion to Ancient Near Eastern Languages*. Hoboken, NJ: John Wiley & Sons, Inc., pp. 27—46.
- Yakubovich, Ilya  
2020 “Hittite”, in: Rebecca Hasselbach-Andee (ed.), *A Companion to Ancient Near Eastern Languages*. Hoboken, NJ: John Wiley & Sons, Inc., pp. 221—237.  
2022 Review of Sylvain Patri, *Hittite Phonologie*. *Journal of the American Oriental Society* 142.1:239—242.
- Yates, Anthony D.  
2017 “Hittite ‘fire’ and ‘proterokinesis’ as Epiphenomenon”. *WeCIEC* 2017 — 3/4 November 2017. Downloaded from academia.edu.
- Zair, Nicholas  
2012 *The Reflexes of the Proto-Indo-European Laryngeals in Celtic*. Leiden and Boston, MA: E. J. Brill.
- Zgusta, Ladislav  
1951 “La théorie laryngale” [The Laryngeal Theory], *Archív Orientální* 19:428—472.

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